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# Exploring cross-national variations in Traffic Safety Culture: Insights into socio-cognitive determinants of self-reported unsafe traffic behaviour from 31 Countries

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy (PhD) in Architecture and Urban Planning

by

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DOCTORAL COLLEGE IN ARCHITECTURE AND URBAN PLANNING

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Urban & Environmental Engineering

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# Dedication

Dedicated to my mother, Ursula Meesmann (°22/12/1941- †15/11/2023).

Thank you for giving me the roots to grow and the courage to become myself.
Everything I am, and all I have achieved, rests on the foundation you gave me.

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# List of Abbreviations

| Abbreviation | Meaning |
|---|---|
| CFA | Confirmatory factor analysis |
| CI | Confidence interval |
| DUI | Driving under the influence of alcohol, drugs or medication |
| EC | European Commission |
| ESRA | E-Survey of Road Users' Attitudes |
| ETSC | European Transport Safety Council |
| EU | European Union |
| GDP | Gross domestic product |
| GEE | Generalised estimating equations |
| GLMM | Generalised linear mixed model |
| HIC | High-income country |
| ITF | International Transport Forum |
| KPI | Key performance indicator |
| KSE-G | Social Desirability–Gamma Short Scale |
| LMIC | Lower-middle-income country |
| OECD | Organisation for Economic Co-operation and Development |
| PAF | Principal axis factoring |
| PBC | Perceived behavioural control |
| PCA | Principal component analysis |
| SARTRE | Social Attitudes to Road Traffic Risk in Europe |
| SDG | Sustainable Development Goal |
| SDR | Socially desirable responding |
| SEM | Structural equation modelling |
| SPI | Safety performance indicator |
| TC | Traffic culture |
| TClimate | Traffic safety climate |
| TCS | Traffic Climate Scale |
| TPB | Theory of planned behaviour |
| TSC | Traffic safety culture |
| UMIC | Upper-middle-income country |
| VIF | Variance inflation factor |
| WHO | World Health Organisation |

# List of statistical notation

| Symbol | Meaning |
|---|---|
| $i$ | Index identifying an individual respondent |
| $j$ | Index identifying a predictor variable |
| $n$ | Number of observations in an analytical sample |
| $N$ | Total number of observations in the original or pooled sample |
| $Y_i$ | Value of the dependent variable for respondent $i$ |
| $X_{ij}$ | Value of predictor $j$ for respondent $i$ |
| $z$ | Standardised score with a mean of zero and a standard deviation of one |
| $\alpha$ | Regression intercept |
| $\beta_j$ | Population regression coefficient for predictor $j$ |
| $\widehat{\beta}_j$ | Estimated unstandardised regression coefficient for predictor $j$ |
| $\beta_j^*$ | Population standardised regression coefficient for predictor $j$ |
| $\widehat{\beta}_j^*$ | Estimated standardised regression coefficient for predictor $j$ |
| $\varepsilon_i$ | Regression error term for respondent $i$ |
| $\mathrm{SE}(\widehat{\beta}_j)$ | Standard error of the estimated regression coefficient |
| $F$ | $F$-test statistic |
| $p$ | $p$-value |
| $R^2$ | Coefficient of determination |
| $\rho$ | Within-cluster working correlation estimated in the GEE analysis |
| $\mathrm{SDR}_{\mathrm{PQ}}$ | Component score representing exaggeration of positive qualities |
| $\mathrm{SDR}_{\mathrm{NQ}}$ | Component score representing minimisation of negative qualities |

# Summary


## Background and rationale

Road traffic deaths and serious injuries remain a major public-health challenge. Their prevention requires more than monitoring final outcomes such as crashes, fatalities, and injuries. The Safe System approach emphasises that safety is produced through the interaction of road users, vehicles, infrastructure, institutions, enforcement, and post-crash care. Safety Performance Indicators complement crash outcomes by measuring conditions and behaviours that are more closely connected to risk. Roadside observations provide valuable evidence on visible behaviour in real traffic, but they are costly, methodologically demanding, and unable to capture many of the beliefs and motivations underlying behaviour. Harmonised questionnaire surveys provide a complementary source of information by combining self-reported behaviour with attitudes, perceived norms, perceived behavioural control (PBC), intention, risk perception, enforcement experiences, and policy support.

This dissertation focuses on Traffic Safety Culture (TSC), broadly understood as the shared values, beliefs, attitudes, norms, and patterns of behaviour through which traffic safety is understood and enacted within a meaningfully defined group. The empirical work adopts the country as the comparative context because legislation, enforcement, licensing, infrastructure standards, and major road-safety policies are often organised nationally. This does not imply that national populations are culturally homogeneous. The national analyses are used to identify country-specific patterns in measured beliefs and behaviour, while recognising that within-country variation and broader institutional and material conditions remain important.

The Theory of Planned Behaviour (TPB) provides the organising framework for the socio-cognitive indicators examined in the dissertation. The TPB links behaviour to attitudes, perceived social expectations, PBC, and behavioural intention. The E-Survey of Road Users' Attitudes (ESRA) was inspired by these ideas but was designed as a broad international monitoring instrument rather than as a complete psychometric TPB questionnaire. The variables used in this dissertation are therefore described as *TPB-inspired socio-cognitive indicators*, not as validated latent TPB constructs.

## Aim and research questions

The dissertation examines cross-national heterogeneity in the adjusted associations between self-reported unsafe car-driving behaviour and TPB-inspired socio-cognitive indicators. It focuses on three major road-safety topics: speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving. These behaviours differ in prevalence, legal status, social acceptability, perceived controllability,

and the contexts in which they occur. Applying one analytical framework to all three therefore enables both cross-country and cross-topic comparison.

The research addresses four questions. First, to what extent are attitudes, norms, PBC, and intention associated with the three self-reported behaviours in pooled cross-national models? Second, to what extent are these adjusted associations also observed within each national sample? Third, how do the estimated coefficients and explanatory power of the national models vary descriptively across countries? Fourth, which recurring and topic-specific patterns emerge across speeding, DUI, and mobile phone use, and what do they imply for the monitoring and interpretation of TSC?

## Data and methods

The analyses use data from the third ESRA survey, conducted in 2023. ESRA3 collected harmonised questionnaire data from more than 37,000 road users in 39 countries. The analytical sample for this dissertation contains 23,669 regular car drivers aged 18–74 years from 31 countries. Eight countries were excluded because of differences in survey mode, insufficient numbers of regular drivers, or extreme weighting factors. National weights were used to reduce deviations from population distributions by gender and age.

For each road-safety topic, prespecified sets of ESRA3 items were combined using principal component analysis (PCA). PCA was used as a data-reduction technique to generate respondent-level component scores from correlated observed items. It was not used to validate latent theoretical factors. The pooled item structure was retained across countries, but PCA was repeated within each national sample, allowing the empirical item weights to differ between countries. The resulting indicators are conceptually analogous, but they cannot be assumed to be strictly measurement-invariant.

The socio-cognitive part of each model included attitudes, norms, PBC, and intention. The attitudes indicator represented a broad risk-permissive orientation across the three topics. The norms indicators combined personal acceptability with perceived social acceptability and were therefore broader than the conventional TPB concept of subjective norm. The PBC indicators primarily captured perceived capability or self-efficacy in performing or managing the unsafe behaviour. Intention was measured by one item per topic. The models also adjusted for socio-demographic characteristics, driving frequency, and two dimensions of social desirability.

One pooled cross-national linear regression model and 31 separate national models were estimated for each behaviour, resulting in 96 regression models. Linear regression was selected because the outcomes were continuous PCA-derived scores and because it provided a transparent and consistent framework for comparing adjusted linear associations. A Generalised Estimating Equations sensitivity analysis produced a negligible average working correlation under the tested structure. This supported retaining the linear regression framework as the principal analysis, but it did not demonstrate that national context was irrelevant or that observations were identical across countries.

## Main findings

The complete pooled model for speeding had an $R^2$ of 0.58. The corresponding values were 0.50 for DUI and 0.52 for mobile phone use while driving. These values refer to the full model specifications, including socio-cognitive indicators, socio-demographic variables,

driving frequency, and social-desirability measures. They should not be attributed to the socio-cognitive indicators alone. Across the 93 national models, model fit ranged from $R^2 = 0.26$ for DUI in Greece to $R^2 = 0.70$ for speeding in the United States, showing that the same analytical framework described some country-topic combinations more closely than others.

For speeding, norms had the largest adjusted coefficient in the pooled model and in every national model. This result is consistent with the widespread normalisation and comparatively high acceptability of moderate speed-limit violations. Attitudes and PBC also showed positive associations, while intention to respect speed limits had a smaller negative association with self-reported speeding. The national speeding models had $R^2$ values between 0.47 and 0.70.

For DUI, norms again had the largest pooled association and were the most prominent socio-cognitive indicator in 27 of the 31 national models. In Bosnia and Herzegovina, Israel, Poland, and Serbia, PBC had the largest coefficient. In this context, PBC may partly reflect confidence in being able to drive safely despite impairment rather than genuine behavioural control. The national DUI models varied most strongly in explanatory power, with $R^2$ values from 0.26 to 0.69.

For mobile phone use while driving, norms and PBC had almost identical pooled coefficients, while attitudes also had a substantial association. The relative ordering of these three indicators varied more across countries than it did for speeding or DUI. Mobile phone use is embedded in habitual digital behaviour and expectations of availability; accordingly, confidence in managing distraction may be especially relevant. The national models had $R^2$ values from 0.37 to 0.63.

Across the three topics, the broad norms indicator was the most consistently prominent socio-cognitive measure. This differs from parts of the conventional TPB literature, in which attitudes often emerge as the strongest construct. The result may partly reflect the ESRA3 operationalisation, which combines personal and perceived social acceptability and therefore captures a wider social and moral domain than a narrow subjective-norm measure. It should not be interpreted as proof that one universal psychological mechanism dominates all unsafe driving behaviour.

Intention had the smallest absolute coefficient in all three pooled models and the least consistent national association. The intention items concerned safe future conduct, whereas the behavioural measures concerned unsafe behaviour during the preceding 30 days. The negative coefficients are consistent with higher intention scores indicating safer future conduct and higher behavioural scores indicating more unsafe past behaviour. The weak associations may also reflect the use of a single intention item and the temporal mismatch between future intention and past behaviour. They do not demonstrate that intention is theoretically unimportant.

A further central result is the substantial descriptive heterogeneity in national coefficients. For example, the norms coefficient for speeding ranged from 0.300 in Greece to 0.581 in France, while the corresponding coefficient for DUI ranged from 0.182 in Serbia to 0.614 in Sweden. Such variation is consistent with the proposition that the meaning and relative importance of safety-relevant beliefs differ across contexts. However, the national coefficients were estimated in separate models, and the dissertation did not formally test coefficient equality through interaction terms, equality constraints, or a multigroup model. The observed differences may also reflect sample composition, translation, response styles, reliability, restricted variation, exposure, enforcement, infrastructure, and country-specific PCA weights. They are therefore interpreted as a comparative map of

heterogeneity rather than as definitive proof of statistically distinct national cultures.

## Scientific and practical implications

The main scientific contribution is the harmonised comparison of three unsafe driving behaviours using the same international dataset, analytical sample, covariates, indicator framework, and modelling strategy. This makes it possible to distinguish a recurring cross-topic pattern from behaviour-specific and country-specific variation. The dissertation also extends TSC monitoring beyond comparisons of prevalence and country means by examining the adjusted relationships between socio-cognitive indicators and behaviour.

The results support the use of socio-cognitive survey indicators as a complement to crash statistics, roadside observations, and formal Safe System indicators. They provide information about beliefs and perceived social expectations (norms) that cannot be observed directly in traffic. The national models can help identify questions that deserve further local investigation, such as whether permissive norms, overconfidence, habit, or risk-permissive attitudes appear especially salient for a particular behaviour and country.

The national models can inform the prioritisation of socio-cognitive targets for the development of context-sensitive interventions. A comparatively large coefficient indicates a belief domain strongly associated with unsafe behaviour in the observed national model and can therefore serve as a useful starting point for formative research and intervention design. Because the analyses are cross-sectional, coefficient magnitudes should not be interpreted as the causal effect of changes in the construct or as an estimate of the effectiveness of a particular intervention. The findings are therefore most informative when combined with behavioural theory, prior intervention evidence, observed behaviour, exposure, enforcement, legislation, infrastructure, crash data, and qualitative evidence, and then evaluated appropriately.

## Limitations and future research

The analyses are based on cross-sectional self-report data. They are consequently vulnerable to recall error, selection bias, careless responding, social desirability, and cross-cultural differences in question interpretation. Although social desirability was included in the models, no statistical adjustment can remove all reporting bias. The cross-sectional design also prevents causal ordering: beliefs may influence behaviour, behaviour may reshape beliefs, or both may be affected by unmeasured contextual factors.

The sample represents regular car drivers aged 18–74 years in the included countries and cannot be generalised directly to occasional drivers, non-drivers, other road-user groups, or countries not represented in the analysis. Geographical coverage remains limited in Africa, South and Southeast Asia, and parts of Latin America. Countries were treated as comparative contexts, but no claim was made that national populations form internally uniform cultural groups.

Measurement is another important boundary condition. ESRA3 was not developed as a dedicated TPB instrument; several indicators were based on a limited number of items, attitudes were not fully behaviour-specific, and formal measurement-invariance testing was not conducted. Country-specific PCA scoring preserved the same item composition but allowed different weights, which limits strict comparisons of coefficient magnitude.

Linear regression also did not model measurement error, indirect effects, or the complete causal structure of the TPB.

Future research should improve behaviour-specific measurement and distinguish more clearly between personal acceptability, injunctive norms, descriptive norms, moral norms, perceived control, and self-efficacy. Additional constructs should be selected according to the behaviour studied. For speeding, moral norm, past behaviour, perceived credibility of speed limits, and self-regulation are particularly relevant. For DUI, future surveys should incorporate perceived sanction certainty, prior detection, substance-specific risk perception, social drinking contexts, and access to alternative transport. For mobile phone use, habit, maladaptive phone use, notification pressure, work-related expectations, task type, and situational driving demand deserve greater attention.

Longitudinal, experimental, and quasi-experimental designs are needed to clarify temporal and causal relationships. Individual survey data should also be linked to contextual indicators concerning enforcement, legislation, infrastructure, mobility alternatives, socioeconomic conditions, and Safe System performance. Once measurement quality and cross-cultural equivalence are sufficiently established, multilevel models and structural equation models could separate individual and contextual influences more explicitly. Research should additionally examine TSC within other meaningfully defined groups, including peer groups, workplaces, organisations, communities, and road-user subcultures.

# Overall conclusion

This dissertation demonstrates that a common set of TPB-inspired socio-cognitive indicators reveals both recurrence and heterogeneity in self-reported unsafe driving across 31 countries. Norms were the most consistently prominent indicator, but their interpretation, the contribution of PBC and attitudes, the weak role of intention, and the explanatory power of the models varied by behaviour and national context. The central contribution is therefore not the confirmation of one universal psychological model. It is the demonstration that harmonised survey data can provide a structured, internationally comparable evidence base for identifying and prioritising candidate socio-cognitive mechanisms associated with unsafe behaviour. Used alongside observed behaviour, prior intervention evidence, and wider Safe System information, this approach can strengthen TSC research, road-safety monitoring, and the development and evaluation of context-sensitive interventions.

# Chapter 1

# Introduction

Road safety is shaped by the interaction between road users, vehicles, infrastructure, institutions, and the wider social context in which mobility takes place. Fatal and serious crashes are therefore not adequately understood as the consequence of isolated individual errors alone. The Safe System approach instead treats serious injury as a system-level problem and recognises that road users will inevitably make mistakes, while the transport system should be organised so that these mistakes do not lead to death or life-changing injury (European Commission, 2019; World Health Organization, 2023). Within this perspective, road-user behaviour remains an essential element of road safety, but it must be interpreted in relation to the formal and informal environments in which behaviour develops. This dissertation focuses on one important part of that informal environment: Traffic Safety Culture (TSC), understood through shared beliefs and socio-cognitive patterns associated with unsafe traffic behaviour across countries.

The chapter first explains why road safety monitoring needs to extend beyond crash outcomes to indicators of exposure, observed behaviour, and self-reported beliefs and behaviour. It then introduces TSC and positions it within the Safe System approach. The Theory of Planned Behaviour (TPB) is subsequently discussed as the conceptual framework used to organise the socio-cognitive indicators examined in the dissertation. The chapter then presents the E-Survey of Road Users' Attitudes (ESRA) initiative, identifies the scientific gap addressed by the dissertation, formulates the research questions, and concludes with the dissertation's scientific contributions and structure.

This chapter draws on background material, conceptual framing, and empirical work developed across several publications and project outputs associated with the doctoral research. These include Meesmann et al. (2020), Meesmann et al. (2025a), Pires et al. (2025),Meesmann & Cools (2026), and Meesmann et al. (2026). The chapter additionally builds on the ESRA2 and ESRA3 synthesis reports (Meesmann et al., 2022, 2025b), the ESRA methodology reports (Meesmann et al., 2023; Meesmann & Wardenier, 2024) and the guest editorials (Meesmann & Nakamura, 2020, 2026).

## 1.1 Monitoring road safety performance

### 1.1.1 Road safety as a public-health and Safe System challenge

Fatalities and injuries caused by traffic crashes remain a major public-health concern. The World Health Organization (2023) estimated that road traffic crashes cause approximately 1.19 million deaths annually and remain the leading cause of death among children

and young people aged 5–29 years. Road traffic injuries also generate substantial social and economic costs through medical expenditure, productivity losses, disability, and the wider consequences for households and communities. In the Stockholm Declaration, governments committed to reducing road traffic deaths and serious injuries by at least 50% by 2030, a target incorporated into the Global Plan for the Decade of Action for Road Safety 2021–2030 (Third Global Ministerial Conference on Road Safety, 2020; World Health Organization, 2021).

The Safe System approach provides the prevailing framework for pursuing this objective. It rejects the assumption that road safety can be achieved solely by requiring individual road users to behave perfectly. Instead, responsibility is shared among public authorities, infrastructure designers, vehicle manufacturers, enforcement bodies, mobility providers, employers, and road users. Safe roads and roadsides, safe vehicles, safe speeds, safe road use, and effective post-crash care should operate jointly so that predictable human errors do not produce fatal or serious outcomes (European Commission, 2019; World Health Organization, 2021). Behavioural research nevertheless remains indispensable within this framework. Formal rules and protective system design can reduce exposure to risk, but their effectiveness also depends on how road users understand, accept, and enact safety in everyday traffic.

The Safe System approach provides a shared international framework, but it is implemented nationally and locally. Countries differ in their legislation and penalty levels, the intensity and visibility of enforcement, licensing and education systems, infrastructure standards, vehicle fleets, mobility options, socioeconomic conditions, and the priority given to road safety in public debate (World Health Organization, 2023). These characteristics shape exposure to risk and the circumstances in which unsafe behaviour becomes possible, convenient, or socially acceptable. The same reported behaviour may therefore have different meanings across national contexts. Cross-national behavioural indicators should consequently be interpreted against the context in which they are measured.

Road-user behaviour is also context-specific at the level of the individual decision. Some decisions involve reflective judgement, such as planning how to get home after drinking or deciding in advance whether to answer calls while driving. Others are made within seconds and involve habitual or automatic responses to immediate situational cues, such as the speed of surrounding traffic, a familiar road, time pressure, or an incoming notification. These processes should be distinguished from the wider cultural and institutional context in which they occur. Traffic Culture concerns the broad societal, institutional, and material context of traffic; Traffic Safety Culture concerns shared safety-related values, beliefs, and norms; and Traffic Safety Climate concerns current perceptions of the traffic environment (Leviäkangs, 1998; Ward et al., 2019; Gehlert et al., 2014; Nævestad et al., 2026); see Section 1.2.2. These concepts provide complementary perspectives on road-user behaviour. Perceptions of the traffic environment should not, however, be equated with the habitual or automatic processes involved in individual decisions.

This dissertation examines three unsafe car-driving behaviours that are prominent in international road safety policy: speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving. Speeding includes both exceeding the posted speed limit and driving too fast for the prevailing traffic, weather, or infrastructure conditions. Speed affects both crash probability and crash severity; aggregate evidence indicates that relatively small changes in mean speed are associated with meaningful changes in fatal and serious crash risk (Elvik et al., 2019). The European Commission identifies excessive or inappropriate speed as an essential contributory factor

in approximately 30% of fatal crashes (European Commission, 2026b).

DUI is associated with impaired perception, attention, judgement, reaction, and vehicle control. Its prevalence and meaning are influenced by legislation, enforcement, alcohol and drug-use patterns, access to alternative transport, and the social acceptability of driving while impaired. Mobile phone use while driving introduces visual, manual, auditory, and cognitive distraction, but the degree of interference varies according to the task, device, traffic context, and regulatory environment (Areal et al., 2024; Cuentas-Hernandez et al., 2024). Legislation is important but does not automatically translate into awareness or compliance. In a European study, Jamson (2013) found that comparatively straightforward and well-publicised rules on handheld mobile phone use were better understood than more complex restrictions applying to other in-vehicle devices. This illustrates a broader point central to the present dissertation: road-user behaviour reflects not only formal regulation but also beliefs about acceptability, controllability, risk, and the behaviour of others.

### 1.1.2 From crash outcomes to safety performance indicators

Road safety performance has traditionally been assessed using the numbers and rates of crashes, fatalities, and injuries. These outcome indicators are indispensable, but they are retrospective and provide limited information about the mechanisms that produced the observed safety level. Countries with similar fatality rates may differ substantially in road-user exposure, infrastructure quality, enforcement, emergency response, and prevalence of unsafe behaviour. Conversely, changes in crash outcomes may be difficult to interpret when exposure changes simultaneously. Van den Bossche et al. (2005) demonstrated the importance of explicitly considering exposure in crash analysis, while composite road safety approaches have shown the value of combining several dimensions of safety performance rather than relying on one final-outcome indicator (Hermans et al., 2008).

Safety Performance Indicators (SPIs) were developed to provide more proximal information on the conditions and processes associated with crash risk. SPIs can cover road-user behaviour, infrastructure, vehicle safety, trauma management, enforcement, and other elements of the road transport system (European Transport Safety Council, 2001; Hakkert et al., 2007; Gitelman et al., 2014). They support the diagnosis of road safety problems, monitoring of policy implementation, comparison between jurisdictions, and evaluation of intervention effects. The development of a performance index, however, also requires explicit methodological choices about indicator selection, normalisation, weighting, aggregation, and uncertainty (Hermans et al., 2008). Consequently, international benchmarking is only informative when the underlying indicators are sufficiently comparable, and their limitations are made transparent.

At the European level, the European Commission introduced a common set of road safety Key Performance Indicators (KPIs) within the EU Road Safety Policy Framework 2021–2030. The first set comprised eight domains: speed, safety-belt and child-restraint use, protective equipment, alcohol, distraction, vehicle safety, infrastructure, and post-crash care (European Commission, 2026a). These indicators were intended to complement casualty outcomes with more direct information about the functioning of the road-safety system.

The Baseline project, conducted between 2020 and 2022, brought together 18 EU Member States and translated the eight KPI domains into harmonised methodological guidelines and national data-collection programmes (Baseline Consortium, 2022). Its

central contribution was not merely the production of national values, but the creation of a common framework specifying how each indicator should be defined, sampled, measured, and reported. This was essential because apparently simple indicators—for example, the percentage of vehicles travelling within the speed limit or the percentage of powered two-wheeler and bicycle riders wearing a protective helmet—can produce non-comparable results when observation sites, time periods, road types, or coding rules differ.

Trendline continued this work from October 2022 to 2025. It involved 25 EU Member States, with two additional Member States and two EFTA countries participating as observers, and combined renewed collection of established KPIs with the development of experimental indicators (European Commission, 2026a; Trendline Consortium, 2025). The experimental work broadened the monitoring framework to topics such as drug-impaired driving, red-light violations, cycling-light use, infrastructure for lower speed limits, enforcement, and self-reported behaviour and attitudes. Of particular relevance to this dissertation, the Trendline work on self-reported behaviour and attitudes drew on the experience of SARTRE and ESRA and treated survey indicators as complements to, rather than substitutes for, behavioural observations (Trendline Consortium, 2025). These developments reflect a gradual broadening of road safety monitoring: final outcomes remain central, but they are increasingly complemented by indicators that capture system performance, observed behaviour, self-reported behaviour, and the beliefs associated with that behaviour.

### 1.1.3 Observed and self-reported behavioural indicators

Road-user behaviour can be monitored through roadside observations, administrative and enforcement data, instrumented vehicles, naturalistic driving studies, simulators, and questionnaire surveys. Roadside observations are particularly valuable for behaviours that are externally visible and can be recorded using a common protocol, such as speed choice, safety-belt use, helmet use, or handheld mobile phone use. For these behaviours, observation is often treated as the reference measurement approach because it records behaviour as it occurs in traffic and does not depend on memory or willingness to disclose unsafe conduct. Baseline and Trendline therefore relied primarily on roadside observations for road-user behaviour KPIs such as speed compliance, protective-system use, and distraction (Baseline Consortium, 2022; Trendline Consortium, 2025).

Observation is not without limitations. Producing a national indicator requires a carefully specified sampling frame covering relevant road types, locations, periods, and traffic conditions; trained observers or validated automated equipment; and common coding and quality-control rules. These requirements make observational studies time-consuming and costly. Moreover, only a limited set of externally visible variables can be collected, and the reasons for the observed behaviour generally remain unknown. Some behaviours, including occasional DUI, hands-free communication, or the underlying motivations for speeding and distraction, are difficult or impossible to observe directly at scale.

Questionnaire surveys provide a complementary source of evidence. When properly designed and sampled, and particularly when administered online, they can produce indicators relatively quickly and at lower cost than national roadside-observation programmes. They can measure self-reported behaviour alongside attitudes, perceived norms, perceived behavioural control (PBC), intention, enforcement experiences, policy support, risk perception, habits, and socio-demographic characteristics. This makes them particularly useful for studying the socio-cognitive mechanisms associated with behaviour and for devel-

oping communication or educational interventions (Vanlaar & Yannis, 2006). Trendline's experimental KPI work similarly concluded that survey indicators provide demographic and attitudinal information that is unavailable from roadside observation and can help identify target groups and the social acceptance of unsafe behaviour (Trendline Consortium, 2025).

Survey measures are nevertheless subject to recall error, non-response and selection bias, careless responding, social desirability, and differences in how questions or response scales are interpreted. Research on self-reported mobility has likewise shown that reporting errors can vary according to respondent and trip characteristics (Cools et al., 2024). Comparisons conducted within Trendline also showed that self-reported and observed indicators do not align uniformly across behaviours and countries, because they measure related but conceptually different phenomena (Trendline Consortium, 2025). Self-report should therefore not be presented as a substitute for observed behaviour, but as a complementary measurement strategy that offers access to otherwise unobservable beliefs, motivations, and experiences.

The value of questionnaire data for international comparison depends on harmonisation at several levels. A common questionnaire, central programming, aligned fieldwork periods, and comparable sampling rules reduce avoidable design differences. Yet procedural harmonisation does not by itself guarantee that a construct is interpreted identically across languages and cultures. Cross-national survey research distinguishes between different forms of measurement equivalence, including whether items reflect the same conceptual structure, whether their relationships with the construct are comparable, and whether observed means can legitimately be compared (De Beuckelaer et al., 2007; De Beuckelaer & Lievens, 2009). These issues are especially important when national differences in attitudes or norms are interpreted as cultural differences. The present dissertation uses a harmonised international survey and applies the same analytical framework across countries, while recognising that complete cross-cultural measurement equivalence cannot be assumed solely from the use of common items.

Several established questionnaires have been developed to measure road-user behaviour. The Driver Behaviour Questionnaire (DBQ), introduced by Reason et al. (1990), is one of the most widely used self-report instruments in traffic psychology. Its original conceptual distinction separated unintended errors from deliberate violations; later DBQ versions frequently distinguished additional dimensions such as lapses, ordinary violations, and aggressive violations. A meta-analysis found that DBQ errors and violations were associated with self-reported crash involvement, although the strength and interpretation of these associations depend on study design and reporting quality (de Winter & Dodou, 2010). Cross-cultural applications have also shown that a common core structure can be informative across countries while individual items, factor structures, and score distributions may still vary by context (Özkan et al., 2006).

Based on the DBQ tradition, Elliott et al. (2007) developed the 43-item Motorcycle Rider Behaviour Questionnaire (MRBQ). The original instrument identified traffic errors, control errors, speed violations, stunt behaviour, and the use of safety equipment. A systematic review and meta-analysis confirmed the broad value of the MRBQ for motorcycle-safety research, while showing that the relationships between individual dimensions and crash involvement are not equally strong and that instrument adaptations complicate comparisons (Chouhan et al., 2023). The DBQ and MRBQ have therefore generated substantial knowledge about risky driving and riding, but they primarily target specific road-user groups and behavioural dimensions. They do not, in their standard

forms, provide the broad combination of attitudes, norms, risk perceptions, enforcement experiences, and policy support required for monitoring TSC across all major road-user groups.

The first sustained European project to apply a common questionnaire and study design across a large number of countries was SARTRE (Social Attitudes to Road Traffic Risk in Europe). Initiated in 1991, it collected harmonised information on attitudes, opinions, self-reported behaviour, and experiences through nationally representative surveys. Four editions were conducted in 1991, 1996, 2002, and 2010; the fourth edition also broadened the road-user groups covered beyond car drivers (Cestac & Delhomme, 2012). SARTRE demonstrated the value of common wording, common sampling principles, and coordinated fieldwork for international benchmarking, while also illustrating the organisational effort required to maintain comparability over time. ESRA was launched in 2015 to continue and globalise this form of harmonised survey-based road-safety monitoring.

## 1.2 Role of Traffic Safety Culture

### 1.2.1 Conceptual origins and development

Traditional road safety interventions have achieved substantial improvements through safer infrastructure, safer vehicles, regulation, enforcement, education, and emergency care (Elvik et al., 2009). Further progress, however, may be constrained when formal policies are not supported by shared expectations and everyday practices. This is one reason why cultural approaches have gained prominence in road safety research. Rather than focusing exclusively on the attributes of isolated individuals, TSC directs attention to the social environments within which beliefs are learned, reinforced, and translated into behaviour.

The concept originates from the broader safety-culture literature, which emerged after the Chernobyl nuclear disaster in 1986, when deficiencies in organisational safety culture were identified as a contributing factor to the accident (Meesmann et al., 2026). Safety culture generally refers to shared values, beliefs, assumptions, norms, and practices related to safety. Its application to road transport required an important conceptual extension because traffic is not a single organisation. It involves private road users, professional drivers, organisations, public authorities, infrastructure operators, enforcement bodies, and other actors whose decisions are interdependent but not governed by one organisational hierarchy.

Ward et al. (2019) defined TSC as the shared beliefs of a group that affect behaviours related to traffic safety. This definition emphasises that beliefs are socially situated and that the relevant cultural unit must be specified. TSC may be studied within a country, region, organisation, workplace, community, family, peer group, or road-user category. The national level is especially relevant for international benchmarking because legislation, enforcement systems, licensing, infrastructure standards, media debate, and major policy frameworks are often organised nationally. Nevertheless, treating a country as an analytical group does not imply that all individuals within that country share identical beliefs or that national borders perfectly delineate a homogeneous culture.

Recent work within the European TRUST project has further integrated TSC with the Safe System approach. Based on literature reviews, Delphi studies, and focus groups, Nævestad et al. (2026) define TSC as encompassing shared values, beliefs, attitudes, norms, and patterns of behaviour that shape how traffic safety is understood and enacted

within a meaningfully defined group of actors in the transport system. This definition is broader than a purely individual-behavioural interpretation. It recognises that cultural patterns may operate among road users, organisations, authorities, and other actors, and that they can either reinforce or undermine formal Safe System arrangements.

### 1.2.2 Culture, context, and the meaning of shared beliefs

Culture is a complex and contested concept. Anthropological and cross-cultural traditions have variously emphasised shared meanings, values, practices, symbols, and frames of reference (Geertz, 1973; Keesing, 1974; Haukelid, 2008). In traffic, national and local contexts influence what behaviours are regarded as normal, legitimate, skilful, inconsiderate, or dangerous. Laws and enforcement communicate formal expectations, while repeated interactions with peers, family, media, institutions, and other road users shape informal expectations.

The relationship between culture and behaviour should not be reduced to fixed national traits. Infrastructure, mobility options, exposure, socioeconomic conditions, vehicle fleets, urban form, and enforcement opportunities all affect both the feasibility and meaning of behavioural choices. Research on traffic climate and risky road use illustrates that perceived interaction patterns and risk-taking orientations are associated with unsafe behaviour in specific mobility contexts (Hoang et al., 2025a). These findings support a contextual interpretation of TSC in which shared beliefs interact with material and institutional conditions.

Three related concepts should be distinguished. Traffic Culture is the broadest of the three and refers to the wider societal, institutional, material, and behavioural context in which traffic operates. The concept can encompass legislation, governance, enforcement, infrastructure, vehicles, mobility practices, economic conditions, skills, attitudes, and behaviour (Leviäkangs, 1998). TSC has a narrower safety-specific focus and concerns shared values, beliefs, attitudes, norms, and behavioural patterns within a meaningfully defined group (Ward et al., 2019; Nævestad et al., 2026). Traffic Safety Climate generally refers to more immediate and context-sensitive perceptions of the traffic environment at a particular point in time (Gehlert et al., 2014). The concepts overlap, but they address different analytical questions and should not be used interchangeably. Table 1.1 summarises the distinction.

The Traffic Climate Scale provides one operationalisation of Traffic Safety Climate. In a representative German road-user sample, Gehlert et al. (2014) identified three dimensions: external affective demands, referring to emotional and interpersonal demands experienced in traffic; internal requirements, referring to the skills and abilities perceived as necessary for successful traffic participation; and functionality, referring to the extent to which the traffic system is perceived as orderly and workable. Climate is thus better interpreted as a more immediate perception of current traffic conditions, whereas culture refers to deeper and more enduring shared meanings and normative patterns. This distinction is analytically useful, but it should not be read as a rigid empirical hierarchy: current perceptions, shared safety beliefs, and broader institutions can influence one another over time.

A further challenge concerns the empirical meaning of "shared". National averages can identify systematic differences between samples, but they do not directly demonstrate consensus within each country. A country may contain substantial variation between age groups, regions, social groups, or mobility cultures. In the present dissertation, countries

**Table 1.1:** Comparison of Traffic Culture, Traffic Safety Culture, and Traffic Safety Climate.

| Aspect | Traffic Culture | Traffic Safety Culture | Traffic Safety Climate |
|---|---|---|---|
| Main focus | Broader social, institutional, material, and cultural context of the traffic system | Shared safety-related values, beliefs, attitudes, norms, and behavioural patterns | Current perceptions and evaluations of the traffic environment |
| Level of analysis | Society or traffic system as a whole | A meaningfully defined group, such as a country, organisation, community, or road-user group | Individual perceptions that may be aggregated to a group level |
| Time perspective | Long-term and relatively stable | Relatively stable but capable of change | More dynamic and responsive to current contextual conditions |
| Typical measures | Legislation, governance, enforcement, infrastructure, mobility organisation, skills, and practices | Shared beliefs, norms, attitudes, values, and accepted behavioural patterns related to safety | Perceived functionality, demands, interpersonal tensions, and requirements of traffic participation |
| Main question | What characterises the traffic system and its wider societal context? | What does a group collectively understand, value, and accept regarding traffic safety? | How do road users currently perceive and evaluate the traffic environment? |

*Source:* Adapted from Leviäkangs (1998), Gehlert et al. (2014), Ward et al. (2019), and Nævestad et al. (2026).

are therefore used as meaningful comparative contexts rather than assumed to be internally uniform cultural units. The national models describe country-specific patterns in the associations between socio-cognitive indicators and self-reported behaviour. These patterns may be consistent with differences in TSC, but they must be interpreted alongside measurement, sampling, and contextual explanations.

### 1.2.3 Traffic Safety Culture and road safety outcomes

Sections 1.2.1 and 1.2.2 introduced Traffic Safety Culture (TSC) as a set of shared values, beliefs, attitudes, norms, and patterns of behaviour, while emphasising that culture is neither uniform within a country nor independent of the wider institutional and material context. A further question is whether TSC is related to road safety outcomes and, if so, at what level that relationship has been established empirically. This section draws in particular on the exploratory cross-national analysis of Meesmann et al. (2026), which links TSC-related elements to self-reported and independently observed road-user behaviour across 22 European countries. The purpose here is not to treat that study as definitive evidence of a causal TSC–crash relationship, but to position the evidence base that motivates the use of TSC as a road safety-relevant framework in this dissertation.

The most direct evidence would link TSC-related indicators to crashes, injuries, or fatalities. A related body of cross-national research has examined the broader concept of national culture using established cultural frameworks, particularly Hofstede's and Schwartz's dimensions. These studies report associations between national cultural characteristics and road safety performance, although the identified dimensions and the strength of the associations vary across country samples, outcome definitions, and statistical controls (Gaygısız, 2010; Van den Berghe et al., 2020). For example, power distance

and several Schwartz value dimensions have been associated with road fatality rates, while individualism has also been linked to cross-national differences in road safety performance (Gaygısız, 2010; Van den Berghe et al., 2020). Related work extends this perspective from road safety outcomes to driver behaviour, showing that cultural dimensions, governance quality, and income level are associated with cross-country variation in speeding and other violations (Arslan & Özkan, 2024). Country affiliation has likewise been used as a proxy for traffic culture: Özkan et al. (2006) found that driving style partly mediated the relationship between country and self-reported crash involvement. Studies of adaptation to a host-country traffic environment provide complementary evidence. Immigrant exposure and time in the host country have been associated with changes in road-user risk and behaviour, suggesting that traffic-related practices may adapt to the surrounding safety culture over time (Chen et al., 2012; Uzondu et al., 2020).

Research that operationalises culture more directly also produces a nuanced picture. Using a symbol-exchange conceptualisation, Rundmo et al. (2012) found relatively weak associations with risk perception but clearer associations with risky driving behaviour. In a comparison of Norway, Ghana, Tanzania, and Uganda, Nordfjærn et al. (2012) found that several cultural orientations were associated with self-reported crash involvement in the African samples, whereas the same pattern was not evident in Norway. These findings therefore do not support a simple conclusion that culture is either strongly or weakly related to road safety; rather, the observed relationship depends on how culture is operationalised, which behavioural or safety outcome is studied, and the context in which the relationship is assessed.

A second strand of research examines TSC or Traffic Safety Climate within countries, or across a small number of countries, and relates these measures to driver behaviour and self-reported crash involvement. The evidence again suggests that the relationship with behaviour is generally clearer than the direct relationship with crashes. In Germany, Gehlert et al. (2014) found that Traffic Safety Climate was related to risk perception, distraction, and traffic violations, but not directly to crashes or near-crashes. In China, Chu et al. (2019) found that Traffic Climate Scale dimensions were related to aberrant and positive driving behaviours; some climate dimensions also showed indirect or direct associations with crash involvement. Similarly, Nævestad et al. (2019) reported that national road safety culture was associated with aggressive violations, which were in turn related to crash involvement among drivers in Norway and Greece. More recent work by Nævestad et al. (2022) likewise linked the valuation of freedom to take risks to risky driving and crash involvement across Norway, Israel, and Greece. Taken together, these studies are consistent with a pathway in which shared values, norms, and perceptions are associated with behaviour, while the subsequent relationship with crashes is more distal and less consistently demonstrated.

The existing evidence base is therefore meaningful but remains methodologically constrained. Much of the literature relies on self-reported behaviour or self-reported crash involvement, most studies are cross-sectional, and exposure to risk is not consistently incorporated. These limitations restrict causal interpretation and make it difficult to determine whether cultural beliefs shape behaviour and road safety outcomes, whether road safety experience shapes those beliefs, or whether both are influenced by wider contextual conditions. Against this background, Meesmann et al. (2026) provide a harmonised cross-national analysis combining ESRA3 survey data from 22 European countries with independently observed behaviour and road safety Key Performance Indicators. Their analyses show consistent alignment between several self-reported and observed be-

haviours and identify significant associations between TSC-related elements—particularly normative beliefs, perceived norms, and habits—and self-reported behaviour across DUI, speeding, distraction, and protective-system use. At the same time, this evidence does not establish a direct causal link between TSC and crashes or fatalities. The submitted study therefore strengthens the behavioural evidence while also making the remaining outcome-level research gap explicit.

This distinction between behaviour-based and outcome-based evidence has a direct methodological implication for the present dissertation. Self-reported unsafe driving behaviour is treated as a proximal behavioural outcome through which TSC-related socio-cognitive patterns can be examined comparatively across countries. It should not be equated with the ultimate road safety outcomes of crashes, serious injuries, or fatalities. Rather, it occupies an intermediate position between shared beliefs and observed safety outcomes and can be studied in a harmonised way across the 31 countries included here. Section 1.3 therefore develops the TPB-inspired socio-cognitive framework used to model this behavioural outcome in the remainder of the dissertation, while the distinction between association, behavioural relevance, and causal safety effects is maintained throughout the interpretation.

## 1.3 Role of socio-cognitive constructs in Traffic Safety Culture

### 1.3.1 The Theory of Planned Behaviour as a conceptual framework

Numerous psychological models explain behaviour through beliefs, evaluations, perceived social expectations (norms), control, habits, identity, and motivation. The TPB is one of the most widely used frameworks for organising these mechanisms (Ajzen, 1991, 2020). In its canonical formulation, behavioural intention is the most proximal predictor of behaviour. Intention is shaped by attitude towards the behaviour, subjective norm, and perceived behavioural control (PBC). PBC may also contribute directly to behaviour where perceptions of control reflect actual opportunities or constraints.

The TPB is valuable because its constructs are behaviour-specific. An attitude towards speeding refers to evaluations of speeding, not a general attitude towards road safety. Subjective norm refers to perceived social pressure to perform or avoid the behaviour, while PBC concerns the perceived ease, difficulty, or controllability of performing it. The principle of compatibility requires predictors and outcomes to correspond in action, target, context, and time. Departures from this principle can weaken associations and complicate interpretation (Ajzen, 2020).

Road safety applications have repeatedly shown that TPB variables are associated with unsafe driving and riding intentions. For speeding, Elliott et al. (2003) found support for the TPB in explaining compliance with speed limits. In an extended TPB study of risky motorcycle riding, Chorlton et al. (2012) showed that attitudes, control beliefs, normative beliefs, past behaviour, moral norm, and self-identity contributed to different speeding intentions. Research with young motorised two-wheeler riders has likewise identified attitudes, norms, PBC, and their underlying beliefs as relevant to unsafe riding across cultural settings (Sumit et al., 2025). These results are important for the current dissertation because they show both the portability of a common socio-cognitive frame-

work and the possibility that its relative components differ by behaviour and context.

Recent meta-analyses confirm that TPB-based models explain meaningful proportions of variance in risky driving intentions and behaviour, while also showing that additional constructs such as moral norm, descriptive norm, self-identity, perceived risk, and past behaviour can improve explanation (Somoray et al., 2024; Hai et al., 2024). The TPB should therefore be understood here as a parsimonious organising framework rather than a complete theory of unsafe traffic behaviour.

### 1.3.2 Behaviour-specific applications

The three behaviours examined in this dissertation differ in prevalence, legality, social meaning, and perceived controllability. Moderate speeding may be widespread and partially normalised even where it is legally prohibited. DUI is generally subject to strong legal and moral condemnation, but behaviour may still depend on enforcement certainty, perceived impairment, transport alternatives, and social drinking contexts. Mobile phone use can be habitual, socially reinforced by expectations of constant availability, and difficult to regulate consistently across rapidly changing device functions (Jamson, 2013; Cuentas-Hernandez et al., 2024).

For speeding, recent synthesis work reinforces the relevance of the TPB while also showing that the original constructs do not exhaust the motivational process. A review and meta-analysis by Rachad et al. (2024) identified moral norm and past behaviour as particularly relevant extensions for explaining speeding intention and behaviour. This is consistent with the wider risky-driving meta-analysis of Somoray et al. (2024), which found that explanatory patterns vary according to the behaviour, measurement design, and additional constructs included. Speeding should consequently be interpreted not only as a function of favourable attitudes or perceived control, but also as a repeated practice embedded in moral evaluations, habit, enforcement expectations, and the perceived normality of moderate violations.

For DUI, the meaning of norms depends on the substance, social setting, and perceived level of impairment. The ESRA2 cross-national analysis already showed substantial country variation in the associations between socio-cognitive indicators and self-reported DUI (Meesmann et al., 2020). More recent research among young adults found that permissive injunctive norms were associated with driving, or riding with a driver, after simultaneous alcohol and cannabis use, while descriptive norms showed a more behaviour-specific pattern (Hultgren et al., 2024). These findings support distinguishing between perceived approval, perceived prevalence, moral condemnation, risk perception, and confidence in one's capacity to drive after substance use rather than treating "norms" or "control" as uniform concepts.

For mobile phone use, behaviour is heterogeneous: calling, messaging, reading social media, navigation, and app use impose different combinations of visual, manual, and cognitive demand. A 2024 expanded-TPB study found that PBC, attitudes, intention, subjective norm, and moral norm contributed differently to intention and reported behaviour across phone-use activities (Okati-Aliabad et al., 2024). Research among Vietnamese motorcyclists similarly identified PBC as a particularly strong correlate of smartphone-use intention and behaviour, while time pressure added explanatory value beyond the standard TPB constructs (Hoang et al., 2025b). Together with the 31-country ESRA3 analysis (Meesmann et al., 2025a), this literature underlines the need to interpret mobile phone use as a socially and contextually embedded family of behaviours rather than as

one homogeneous distraction category.

These differences imply that the same construct may have a different substantive meaning across behaviours. PBC in relation to speeding may reflect perceived ease of controlling speed or confidence in handling a vehicle at higher speeds. For DUI, a positive association between a self-efficacy-type item and behaviour may indicate confidence in being able to drive safely while impaired. For mobile phone use, it may represent confidence in multitasking or managing distraction. Norms may refer to perceived approval, observed prevalence, or personal acceptability, depending on the measurement instrument. This makes precise operational terminology essential.

ESRA was inspired by socio-cognitive theory but was not designed as a complete, validated TPB questionnaire for each behaviour. The present dissertation therefore refers to *TPB-inspired socio-cognitive indicators*. The ESRA-specific norms indicator combines personal and perceived social acceptability; it is broader than the canonical subjective-norm construct. The PBC items mainly capture behaviour-specific self-efficacy. The attitudes component includes items across several unsafe behaviours and is consequently better interpreted as a general risk-permissive orientation than as a fully behaviour-specific latent attitude. These distinctions are developed further in Chapter 3.

### 1.3.3 Cross-national comparison and measurement challenges

Cross-national comparison can reveal whether a common socio-cognitive framework produces similar or different patterns across contexts. ESRA2 analyses demonstrated the potential of this approach for DUI, showing that the associations between socio-cognitive indicators and self-reported behaviour varied across countries (Meesmann et al., 2020). Using ESRA3 data, Meesmann et al. (2025a) extended this comparative perspective to mobile phone use while driving and to speeding in 31 countries. The broader ESRA3 comparison across 39 countries further illustrates how harmonised indicators can support international road safety and culture monitoring (Pires et al., 2025).

At the same time, cross-national differences in estimated coefficients can arise from several sources. They may reflect substantive differences in beliefs, legislation, enforcement, infrastructure, mobility practices, or exposure. They may also reflect sample composition, response styles, translation, reliability, restricted variation, or non-equivalent measurement. De Beuckelaer et al. (2007) demonstrated that the use of a common survey across countries does not automatically establish all forms of measurement equivalence, and that scalar equivalence—required for unqualified mean comparisons—can be particularly demanding. The dissertation therefore interprets national model differences cautiously. They are treated as descriptive evidence of heterogeneity in the measured associations, not as definitive proof that every numerical difference represents a statistically distinct national culture.

Self-report and cross-cultural response processes also affect interpretation. Socially undesirable behaviours may be underreported, and the degree of underreporting may itself vary across countries. The ESRA3 questionnaire includes a validated short social-desirability scale, which allows the statistical models to adjust for two response tendencies. This does not eliminate all reporting bias, but it provides a more explicit treatment than is common in large international road safety surveys.

## 1.4 The ESRA initiative

The ESRA initiative was launched by the Vias institute in 2015 to fill the gap that followed the final SARTRE survey. ESRA is a collaboration between road safety institutes, research organisations, public authorities, and other partners. Its aim is to produce harmonised and cost-efficient international indicators of self-reported road-user behaviour, beliefs, experiences, and policy support. The initiative has evolved from a primarily European survey into a global monitoring system.

Four principles are central to ESRA: a common core questionnaire; an agreed study design; centrally coordinated programming, fieldwork, data processing, and quality control; and active participation by national partners in translation and interpretation. This coordination improves procedural comparability and makes it possible to benchmark patterns across countries. It does not remove every difference in panel coverage, language, or response behaviour, which is why the sampling, weighting, data-cleaning, and construct-operationalisation choices require explicit documentation.

ESRA1 was implemented between 2015 and 2017 and ultimately included 38 countries (Meesmann et al., 2018). ESRA2 was conducted between 2018 and 2020 and expanded the initiative to 48 countries (Meesmann et al., 2022, 2023; Meesmann & Wardenier, 2024; Meesmann et al., 2025b). ESRA3 collected data in 2023 from more than 37,000 road users in 39 countries on five continents (Meesmann & Wardenier, 2024; Meesmann et al., 2025b; Pires et al., 2025; Meesmann & Nakamura, 2026). The survey covers several road-user groups and a broad set of road safety themes, including speeding, DUI, distraction, protective systems, enforcement, crash involvement, infrastructure, and support for policy measures.

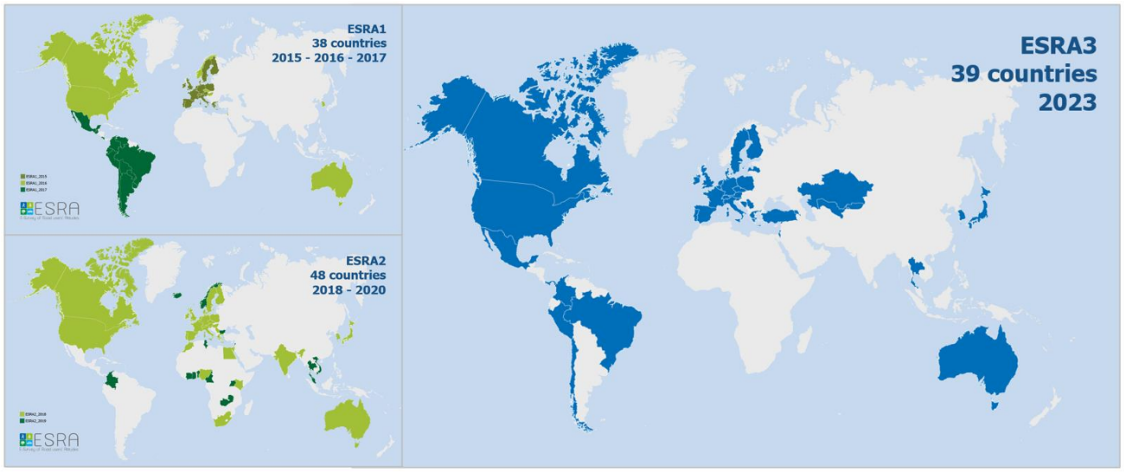



**Figure 1.1:** Evolution of the geographical coverage of the ESRA initiative, 2015–2023.

The present dissertation uses ESRA3 data but has a more specific analytical focus than the general ESRA monitoring reports. It examines regular car drivers in 31 countries and applies a common modelling strategy to speeding, DUI, and mobile phone use while driving. This design allows the associations between comparable sets of socio-cognitive indicators and behaviour to be examined at both pooled cross-national and individual-country levels. Applying the same analytical framework to three topics also enables a structured cross-topic comparison that cannot be obtained from separate descriptive reports alone.

The author of this dissertation is the coordinator of the ESRA initiative at Vias institute. Together with colleagues, she initiated ESRA in 2015 and has coordinated the initiative, including all three survey editions, since then. For ESRA3, her responsibilities included securing the participation and contributions of partner organisations, leading the development of the common master questionnaire in consultation with the ESRA steering group, coordinating the survey with national partners and market research agencies, defining central data-preparation and data-cleaning rules, and contributing to and supervising data curation, quality assurance, and construction of the international database. She also led the preparation of the ESRA2 and ESRA3 methodology and synthesis reports; her contributions to these reports are specified in Chapter 2.

This programme work was collaborative. Questionnaire development and study design were agreed with the steering group and partners, translations were provided and validated by national partners, and fieldwork was carried out by Dynata, Ipsos, and Punto de Fuga. The dissertation-specific work comprises the selection of the analytical sample, the theory-guided assignment of ESRA3 items to TPB-inspired indicators, construction of the PCA-derived composite scores, pooled and national regression analyses, cross-topic comparison, and integrated interpretation in relation to TSC. Beyond the descriptive prevalence estimates presented in the ESRA monitoring reports, the dissertation examines the joint adjusted associations between socio-cognitive indicators and behaviour across topics and countries within a common analytical framework.

## 1.5 Research gap, objectives, and research questions

The literature establishes that socio-cognitive constructs are associated with unsafe traffic behaviour, that cultural and contextual conditions vary between countries, and that harmonised surveys can support international monitoring. Four gaps nevertheless remain.

First, many road safety studies focus on one country, one behaviour, or one road-user group, which limits direct comparison of the relative importance of socio-cognitive indicators across contexts. Second, international monitoring studies frequently emphasise prevalence and mean differences, while comparatively less attention is paid to whether the adjusted relationships between beliefs and behaviour differ across national samples. Third, studies of speeding, DUI, and mobile phone use often apply different instruments, samples, or analytical methods, making cross-topic conclusions difficult. Fourth, large multi-purpose international surveys may contain TPB-inspired items without providing a complete validated TPB instrument for each behaviour. The resulting analytical compromises and the inferences these data can support need to be made explicit and distinguished from validation of a complete latent TPB model.

The overarching objective of this dissertation is therefore to examine cross-national heterogeneity in the adjusted associations between self-reported unsafe car-driving behaviour and TPB-inspired socio-cognitive indicators. TSC is operationally approached as the pattern of shared safety-relevant beliefs and behaviour observed within a national context. This operational approach does not assume complete cultural homogeneity within countries and does not claim that the measured indicators exhaust the broader TSC concept defined in Section 1.2.

The dissertation focuses on three behaviours: speeding, DUI of alcohol, drugs or medication, and mobile phone use while driving. For each behaviour, the analysis considers attitudes, norms, PBC, and behavioural intention, while adjusting for socio-demographic characteristics, driving frequency, and social desirability. The analytical sample contains

23,669 regular car drivers from 31 ESRA3 countries. One pooled cross-national model and 31 separate national models are estimated for each behaviour.

The following research questions guide the dissertation:

**RQ1.** To what extent are the TPB-inspired socio-cognitive indicators associated with self-reported speeding, DUI, and mobile phone use while driving in pooled cross-national models covering 31 countries?

**RQ2.** To what extent are these adjusted associations observed within each of the 31 national samples?

**RQ3.** How do the estimated coefficients and explanatory power of the national models vary descriptively across countries for each road safety topic?

**RQ4.** Which common and topic-specific patterns emerge when the models for speeding, DUI, and mobile phone use while driving are compared, and what do these patterns imply for the monitoring and interpretation of TSC?

The wording of RQ3 is deliberately descriptive. Separate national estimates can reveal patterns of heterogeneity, but numerical differences between coefficients are not equivalent to formal statistical tests of coefficient equality. This distinction is retained throughout the interpretation of the findings.

## 1.6 Scientific contributions and structure of the dissertation

### 1.6.1 Scientific contributions of the dissertation

The dissertation makes four main contributions. First, it provides a harmonised cross-national analysis of three major unsafe driving behaviours using the same sample, conceptual framework, and model specification. Second, it contributes to TSC research by moving beyond comparisons of prevalence and examining the country-specific patterns through which socio-cognitive indicators are associated with behaviour. Third, it provides a transparent methodological account of the construction of PCA-derived composite indicators and of the reasons for using a regression-based rather than a latent-variable approach. Fourth, it connects the empirical findings to road safety monitoring and shows how people's thinking and behaviour can help identify which safety measures should be prioritised, without claiming that these factors directly cause the effects of an intervention.

### 1.6.2 Scientific outputs underpinning the dissertation

The dissertation was developed within a broader programme of research on cross-national road safety monitoring, Traffic Safety Culture (TSC), and socio-cognitive correlates of unsafe driving behaviour. Several components of the thesis build on scientific papers and reports produced during the doctoral research. Table 1.2 summarises the principal outputs that directly underpin the dissertation and identifies where they contribute to the thesis.

The dissertation nevertheless constitutes an integrated monograph rather than a compilation of publications. Previously published or submitted work has been revised, extended, and brought together within a common conceptual and methodological framework. In addition, several analyses and the integrated cross-topic synthesis were developed specifically for the dissertation.

**Table 1.2:** Principal scientific outputs directly underpinning the dissertation and their main use in the thesis.

| Scientific output | Main contribution to the dissertation |
|---|---|
| Meesmann & Cools (2026) | Methodological basis for Chapter 3; empirical basis for the speeding results in Section 4.2 and their discussion in Chapter 5; input to the cross-topic synthesis and conclusions. |
| Meesmann et al. (2025a) | Methodological basis for Chapter 3; empirical basis for the mobile phone use results in Section 4.4 and their discussion in Chapter 5; background for the cross-national comparison and conclusions. |
| Meesmann et al. (2020) | Precursor to the common socio-cognitive modelling approach; basis for the development and interpretation of the DUI analysis in Sections 4.3 and 5.1.2; background for the cross-national comparison. |
| Pires et al. (2025) | Background for international road safety performance and TSC monitoring in Chapter 1 and for the description and positioning of the ESRA3 data in Chapter 2. |
| Meesmann et al. (2026) | Basis for Section 1.2.3 on TSC and road safety outcomes and input to the discussion of TSC monitoring, road safety outcomes, and future research. |
| Meesmann & Nakamura (2020); Meesmann & Nakamura (2026) | Background for the development of ESRA as an international road safety performance and TSC monitoring initiative, particularly in Chapters 1 and 2. |
| Meesmann et al. (2022); Meesmann & Wardenier (2024); Meesmann et al. (2025b) | Documentation of the ESRA survey framework, questionnaire, fieldwork, sampling, data processing, weighting, and international scope used primarily in Chapters 1 and 2 and in the methodological discussion. |

Beyond the outputs listed in Table 1.2, the doctoral research generated a broader portfolio of peer-reviewed publications, scientific and project reports, and conference contributions. Only outputs that directly underpin the conceptual, methodological, or empirical content of the dissertation are included in Table 1.2.

Figure 1.2 provides a visual overview of the dissertation. The broader Safe System and national context shape the formal and informal conditions of road use. ESRA3 supplies harmonised individual-level data on TPB-inspired socio-cognitive indicators, self-reported behaviour, socio-demographic characteristics, driving exposure, and social desirability. The empirical analysis examines three behaviours using pooled and national regression models. The final synthesis compares the resulting patterns across topics and countries and interprets them in relation to TSC.

The remainder of the dissertation is organised as follows. Chapter 2 describes the ESRA3 questionnaire, fieldwork, sampling, central data-processing procedures, and the analytical sample. Chapter 3 explains sample selection, weighting, item assignment, PCA-derived component scores, regression modelling, and the sensitivity analysis of within-country correlation. Chapter 4 presents the sample composition followed by the results for speeding, DUI, and mobile phone use while driving, and concludes with a cross-topic comparison. Chapter 5 discusses the substantive findings, their implications for TSC monitoring and road safety policy, and the methodological limitations of the study. Chapter 6 summarises the contribution of the dissertation and identifies priorities for future research.

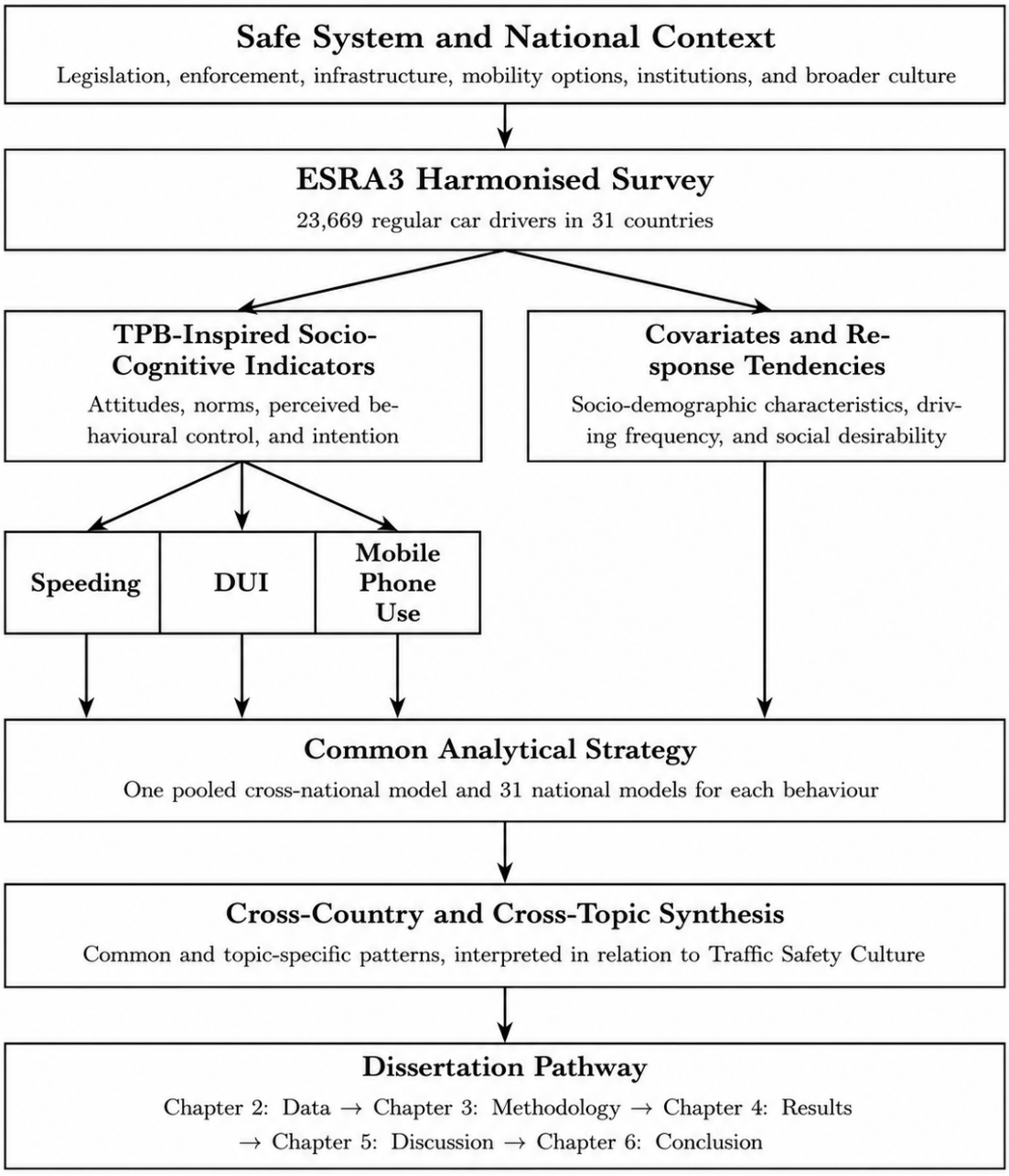



**Figure 1.2:** Conceptual and analytical overview of the dissertation. DUI = driving under the influence of alcohol, drugs or medication; TPB = Theory of Planned Behaviour.

# Chapter 2

# Data

This chapter is based primarily on the methodological documentation of ESRA3 provided by Meesmann & Wardenier (2024) and the ESRA3 synthesis report by Meesmann et al. (2025b), with additional methodological and historical context from the ESRA2 synthesis and methodology reports (Meesmann et al., 2022, 2023). Relative to these sources, the present chapter condenses the full ESRA documentation to the elements relevant to this dissertation and does not introduce additional data-collection procedures beyond those documented in the original ESRA sources.

The author of this dissertation is first author of these four reports and leads the ESRA work on which they are based. Her contributions, which are the same for all four reports, are described using the Contributor Roles Taxonomy (CRediT; Brand et al., 2015): **Uta Meesmann:** Conceptualization; Methodology; Formal analysis (equal); Data curation (equal); Writing – original draft; Writing – review & editing; Supervision; Project administration; Funding acquisition. The co-authors also contributed to formal analysis and data curation, with contributions shared equally with the author. Questionnaire programming, validation, investigation, and visualisation were undertaken under her supervision by co-authors and, for questionnaire programming and fieldwork, by the market research agencies. Questionnaire translation and national validation were provided by the ESRA partners.

This chapter describes the origin, scope, collection, and central processing of the ESRA3 data used in this dissertation. It distinguishes the *source dataset* produced by the international ESRA3 survey from the *analytical dataset* constructed for the present study. The chapter first introduces the design and scope of ESRA3, then describes questionnaire development and translation, survey mode, sampling and fieldwork, central data preparation and quality assurance, weighting and dissemination variables, and the socio-cognitive content relevant to the dissertation. The study-specific selection of countries and regular car drivers, and the construction of the variables used in the statistical models, are described in Chapter 3.

## 2.1 ESRA3 as the source dataset

The present dissertation uses data from the third edition of the E-Survey of Road Users' Attitudes (ESRA3), conducted in 2023. ESRA is a joint international initiative of road safety institutes, research centres, public authorities, and private sponsors, coordinated by Vias institute in Belgium. Its purpose is to collect internationally comparable information on road safety performance and Traffic Safety Culture (TSC) through a common

questionnaire and a centrally coordinated survey design (Meesmann & Wardenier, 2024).

Two organisational principles are particularly important for the present dissertation. First, the participating partners agree on a common master questionnaire, sampling framework, programming specifications, and data-processing rules. Second, survey administration, database construction, central quality control, and the preparation of common outputs are coordinated by Vias institute in collaboration with the ESRA steering group (BASt, Germany; DTU, Denmark; IATSS, Japan; University Gustave Eiffel, France; ITS, Poland; KFV, Austria; NTUA, Greece; PRP, Portugal; SWOV, the Netherlands; and TIRF, Canada). National partners are responsible for funding or supporting the national fieldwork, translating the master questionnaire, validating the programmed national version, and providing contextual knowledge for interpreting the national data (Meesmann & Wardenier, 2024). Part of the funding for Vias institute, which coordinates the ESRA initiative, is provided by the Belgian Federal Public Service Mobility & Transport.

ESRA3 was designed to remain as close as possible to the methodological approach used in ESRA2. The continuity concerned the data-collection mode, formulation of core items, quota sampling, central processing, and cleaning procedures. Limited adaptations were introduced to improve data quality and extend the scope of the survey, including additional questions on infrastructure and e-scooter use and stricter criteria for identifying careless responding. This balance between continuity and adaptation is important because ESRA aims not only to compare countries within one survey wave, but also to develop time series across successive editions (Meesmann & Wardenier, 2024).

## 2.2 Questionnaire scope and development

### 2.2.1 Target groups, themes, and road safety topics

The ESRA3 questionnaire addresses several types of road users and combines behavioural, attitudinal, experiential, and socio-demographic information. Its principal target groups, themes, and road safety topics are summarised in Table 2.1. The questionnaire covers car occupants, moped riders and motorcyclists, cyclists, pedestrians, and e-scooter riders. E-scooter riders and questions on infrastructure were new additions in ESRA3. The principal road safety topics include speeding, driving under the influence (DUI) of alcohol, drugs or medication, protective systems, distraction, and fatigue (Meesmann & Wardenier, 2024).

The ESRA3 master questionnaire was not developed in isolation. Its items built on questions used in previous ESRA editions and on earlier road safety surveys, including the Belgian three-yearly Road Safety Attitude Survey, the European SARTRE survey, and the Traffic Safety Culture Index in the United States. The questionnaire also reflects road safety topics identified as policy priorities by the World Health Organization and as potential performance indicators by the European Commission (Meesmann & Wardenier, 2024). Maintaining the wording of core ESRA2 questions where possible supported comparability between survey waves, while new items expanded coverage of emerging road-user groups and policy concerns.

### 2.2.2 Questionnaire length, translation, and programming

The English master questionnaire was developed collaboratively by Vias institute and the ESRA3 steering group. National partners translated it into 49 national language versions and validated the programmed survey links before fieldwork. The questionnaire was

**Table 2.1:** Scope of the ESRA3 questionnaire.

| Road-user groups | Main themes | Road safety topics |
|---|---|---|
| • car drivers and passengers<br>• moped riders and motorcyclists<br>• cyclists<br>• pedestrians<br>• e-scooter riders | • mobility and exposure<br>• self-reported safe and unsafe behaviour<br>• personal and perceived social acceptability<br>• attitudes towards safe and unsafe behaviour<br>• subjective safety and risk perception<br>• support for policy measures<br>• enforcement experiences and opinions<br>• road crash involvement<br>• infrastructure<br>• regional questions<br>• socio-demographic characteristics | • speeding<br>• DUI of alcohol, drugs or medication<br>• protective systems, including seat belts and helmets<br>• distraction<br>• fatigue |

*Source:* Adapted from Meesmann & Wardenier (2024). The complete ESRA3 questionnaire is reproduced in Appendix A.

programmed using seven character systems: Armenian, Cyrillic, Greek, Hebrew, Japanese, Latin, and Thai. The final median interview duration was 23 minutes (Meesmann & Wardenier, 2024).

Central development and programming reduce avoidable differences between national implementations, but translation inevitably introduces a further layer of interpretation. National partners therefore played a dual role: they provided linguistically and contextually appropriate translations and subsequently reviewed the national datasets and outputs. Harmonised administration improves procedural comparability, but it does not by itself establish that all items have identical measurement properties across languages and countries. This limitation is returned to in the discussion of cross-national comparability in Section 2.7.

## 2.3 Survey mode, sampling, and fieldwork

### 2.3.1 Online-panel survey design

ESRA3 was primarily administered as a self-completed web survey using respondents recruited from commercial internet panels. This mode was selected because it permits the same programmed questionnaire and filter logic to be applied across many countries within a relatively short fieldwork period. Self-administered web surveys may also reduce some forms of socially desirable responding compared with interviewer-administered surveys, although they remain susceptible to selection, recall, interpretation, and response-quality problems (Baker et al., 2010; De Leeuw et al., 2008; Goldenbeld & De Craen, 2013).

The online approach enabled fieldwork in most countries to be completed in approximately two to three weeks and reduced the time and resources required for international database construction. However, internet penetration, panel coverage, and digital skills differ between countries and population groups. Consequently, online-panel samples should be described as quota-based samples designed to approximate national adult populations on selected characteristics, rather than as probability samples in which every eligible individual had a known and non-zero selection probability.

### 2.3.2 Quota sampling and fieldwork organisation

The target was approximately 1,000 respondents aged 18–74 years per country. Hard quotas were imposed for gender and six age groups: 18–24, 25–34, 35–44, 45–54, 55–64, and 65–74 years. The geographical distribution of the sample within each country was monitored as a soft quota. Dynata, Ipsos, and Punto de Fuga organised the fieldwork under the supervision of Vias institute. Data collection took place between May and September 2023 and was conducted within one coordinated international fieldwork period across the 39 participating countries (Meesmann & Wardenier, 2024).

The target sample size or survey mode could not be achieved in every country. Luxembourg used a smaller online-panel sample because of panel-size constraints. In Armenia, Kyrgyzstan, and Uzbekistan, suitable online panels were unavailable; respondents were therefore recruited in several urban areas and completed computer-assisted personal interviews. In these three countries the sample was limited to 500 respondents and to the three youngest age groups. Because their collection mode differed from the predominant online-panel design, they were excluded from ESRA3 regional means and are not included in the dissertation's analytical sample (Meesmann & Wardenier, 2024).

## 2.4 Data preparation and quality assurance

### 2.4.1 Database preparation and validation

The market research agencies were required to apply predefined minimum cleaning criteria and deliver their national data in a common database template. Vias institute then combined the national files into one international database. Before the second-stage cleaning, the central team checked each delivery against the ESRA3 codebook, merged the files from the three agencies, verified consistency between programmed filters and expected missing-data patterns, and examined compliance with the national gender-by-age quotas. Deviations of less than five percentage points from a quota target were tolerated and remaining deviations were addressed through weighting (Meesmann & Wardenier, 2024).

This central processing stage is a substantive strength of the dataset. It reduces the risk that national databases differ because of local coding decisions, inconsistent filters, or country-specific cleaning rules. It also creates a documented data provenance pathway from the common questionnaire to the international analytical file.

### 2.4.2 Data-cleaning criteria

Data cleaning was conducted in two stages: first by the market research agencies and subsequently through central verification and additional cleaning by Vias institute. The procedures addressed four broad types of data-quality concern.

1. **Duplicate records and inconsistencies.** Duplicate entries were assessed using respondent characteristics and, where available, IP information. Inconsistencies between survey responses and panel information, such as region of residence, were also checked.

2. **Interview duration.** Car drivers who completed the questionnaire in less than eight minutes were classified as "speeders". The criterion was restricted to car drivers because other road-user groups received fewer questions. Respondents whose recorded interview duration exceeded 24 hours were classified as "turtles" and removed because extended interruptions could affect response consistency. The final median interview duration was 23 minutes.

3. **Implausible or invariant response patterns.** Respondents providing impossible extreme patterns for transport-mode use were removed. Straightlining was assessed across four matrix questions. A respondent was classified as a straightliner when the same response was selected for more than 75% of the items within a matrix and this pattern occurred in at least three of the four assessed matrices.

4. **Instructed-response items.** Two items instructed respondents to select a specified response option. Respondents who failed at least one of the two items were removed. This rule was deliberately stricter than the initial agency rule, which required failure on both items. Instructed-response items are widely used to identify insufficient attention and careless responding in survey data (Meade & Craig, 2012; Kam & Chan, 2018; Ward & Meade, 2023).

An additional country-specific quality check was conducted for Germany after the national ESRA3 partner raised concerns about several response patterns. Twenty-six additional respondents were removed under this procedure. Across all central cleaning steps, 5,742 respondents were removed from the agency-delivered dataset of 42,835 records, corresponding to 13.4%. The resulting cleaned ESRA3 source dataset contained 37,093 respondents (Meesmann & Wardenier, 2024).

The comparatively large proportion removed in ESRA3 primarily reflects the stricter instructed-response criterion. This should not be interpreted simply as a deterioration in the final dataset. Rather, it documents a more conservative decision about the minimum level of respondent attention required for inclusion. The same decision also has consequences for comparisons with previous ESRA waves, for which cleaning rules were less strict.

## 2.5 Reporting variables and survey weights

For the common ESRA3 descriptive reports and dashboard, selected five- and seven-point response scales were converted centrally into binary indicators. The purpose was to facilitate communication and comparison of prevalence estimates. The original response categories were retained in the ESRA3 database, and the questionnaire documentation records the cut-off and reference category for each dichotomised indicator (Meesmann & Wardenier, 2024).

This distinction is important for the present dissertation. The PCA-derived scores and regression analyses are based on the original multi-category items, not on the binary variables prepared for the common ESRA3 descriptive outputs, unless explicitly stated otherwise. Dichotomisation is therefore part of the broader ESRA3 data infrastructure

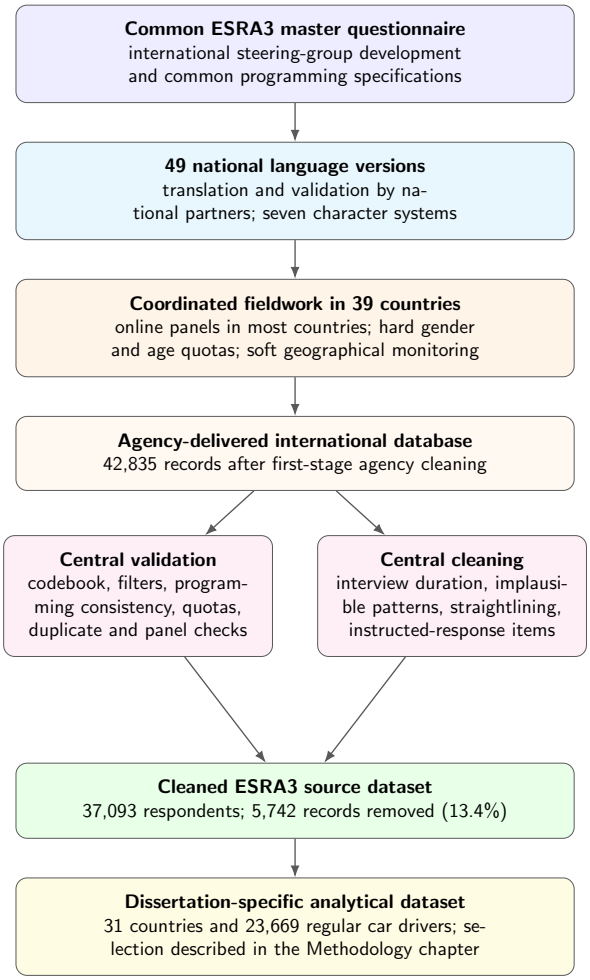



**Figure 2.1:** Provenance and quality-assurance pathway from the ESRA3 master questionnaire to the dissertation's analytical dataset.

but not the principal transformation used to construct the dissertation's behavioural and socio-cognitive scores.

ESRA3 provides an individual country weight based on the joint distribution of gender and the six age groups using United Nations population statistics (United Nations Statistics Division, 2023). Regional weights for Europe, America, and Asia/Oceania additionally account for the relative population size of each participating country within the corresponding ESRA region. These regional weights therefore refer to groups of participating countries and not to subnational regions within individual countries. The present dissertation uses national weights to address residual deviations from the national gender-by-age distributions; the specific implementation of weighting in descriptive and model-based analyses is reported in Chapter 3. Weighting improves alignment with the margins used to construct the weights but does not correct selection differences related to unweighted characteristics such as education, digital participation, income, or interest in road safety.

## 2.6 Socio-cognitive content of the ESRA3 questionnaire

The ESRA questionnaire was informed by the Theory of Planned Behaviour (TPB), which links behavioural intention and behaviour to attitudes, perceived norms, and perceived behavioural control (PBC) (Ajzen, 1991). ESRA3 was nevertheless developed as a broad international road safety monitoring instrument, not as a dedicated and fully validated TPB scale. The survey had to cover several road safety topics and road-user groups within an acceptable completion time. Consequently, the questionnaire contains selected TPB-inspired items rather than extensive multi-item measures of every theoretical construct.

The item selection developed over successive ESRA editions. A pilot study conducted in 2017 among approximately 3,000 respondents in Austria, Brazil, Canada, India, Nigeria, and the United Kingdom was used to reduce a longer list of candidate items to a more compact set suitable for international monitoring. The item set was subsequently refined in ESRA2 and ESRA3. This history explains why the present dissertation uses the TPB as a conceptual framework while referring to the resulting measures as *TPB-inspired socio-cognitive indicators* rather than validated latent TPB constructs.

In ESRA3, the construct referred to as *norms* combines personal acceptability and perceived social acceptability. This operationalisation is broader than the conventional TPB concept of subjective norm because personal acceptability also captures an individual's own normative evaluation. PBC is represented mainly through behaviour-specific self-efficacy or perceived capability. Attitudes and intentions are represented by a limited number of topic-specific items. The exact item allocation and the construction of the component scores used in the dissertation are described in Section 3.3.

The questionnaire also includes the six-item Social Desirability–Gamma Short Scale (KSE-G), which captures exaggeration of positive qualities and minimisation of negative qualities (Nießen et al., 2019). Including these indicators as covariates is particularly relevant because speeding, DUI, and mobile phone use while driving are socially and legally sensitive behaviours for which underreporting or favourable self-presentation may vary across respondents and countries.

## 2.7 Data quality considerations for cross-national analysis

The ESRA3 design provides an unusually broad and harmonised international source of individual-level road safety data. The common questionnaire, central programming specifications, common fieldwork period, quota framework, database template, and central quality controls substantially improve comparability relative to an ex-post comparison of unrelated national surveys. Nevertheless, harmonisation should not be equated with complete equivalence.

First, the samples were recruited from online panels rather than from probability samples, and panel composition, internet access, and digital literacy differ across countries. Gender and age weighting cannot remove all associated selection bias. Second, response scales and item wording may be interpreted differently across languages and cultural contexts, even after careful translation. Third, self-reported behaviour remains susceptible to recall error, social desirability, and other response tendencies. Fourth, some countries could not meet the target sample size or used a different collection mode. These limitations motivated the dissertation's exclusion of countries with materially different fieldwork designs, small samples of regular car drivers, or extreme weights, as explained in Chapter 3.

Finally, the availability of harmonised data does not by itself establish cross-national measurement invariance. The present dissertation therefore interprets the constructed scores as analogous TPB-inspired indicators derived from common items and treats cross-country variation in regression estimates descriptively. More formal assessment of measurement equivalence would require a measurement model based on sufficiently rich multi-item scales, which was not the primary design objective of ESRA3.

## 2.8 Chapter summary

ESRA3 combined a common international questionnaire with coordinated translation, quota-based fieldwork, central database construction, and a documented two-stage quality-control procedure. The cleaned source dataset contains 37,093 respondents from 39 countries. The survey's breadth permits the joint analysis of self-reported behaviour, socio-cognitive indicators, exposure, socio-demographic characteristics, and social desirability. At the same time, the online-panel design and the compact, multi-purpose questionnaire impose limitations on representativeness and construct measurement. Chapter 3 describes how the source data were restricted to the 31-country sample of regular car drivers and transformed into the component scores and regression variables used in the empirical analyses.

# Chapter 3

# Methodology

The analytical approach presented in this chapter builds on the methodologies developed by Meesmann & Cools (2026), Meesmann et al. (2025a), and Meesmann et al. (2020). The methodology used for speeding is identical to the approach adopted here. The methodology for mobile phone use while driving is also nearly identical, except that the intention indicator was not standardised in the original publication; this inconsistency is corrected in the present dissertation so that intention is treated consistently across the three road safety topics. The earlier DUI analysis differs more substantially. In addition to the socio-cognitive indicators retained here, it included habits as a predictor and operationalised intention using three items, in a manner comparable to the construction of the attitude indicator. In the present dissertation, intention is instead represented by a single topic-specific indicator for each of the three road safety topics. These adaptations establish a harmonised analytical framework that permits direct cross-topic comparison.

This chapter describes the dissertation-specific analytical framework. The ESRA3 survey design, questionnaire development, fieldwork, central data preparation, and source-data quality procedures are described in Chapter 2. The present chapter explains how the analytical sample was constructed from that source dataset, how the behavioural and socio-cognitive variables were operationalised, why principal component analysis (PCA) was used to derive composite indicators, and how the regression models and sensitivity analyses were specified.

The methodological strategy was designed to permit systematic comparison across three road safety topics, i.e., speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving, while maintaining the same analytical sample, predictor set, and general model specification. The analyses are descriptive and associational. They estimate adjusted relationships between self-reported behaviour and TPB-inspired socio-cognitive indicators, thereby identifying candidate belief domains for further formative and intervention-oriented research. They do not, however, test a complete causal Theory of Planned Behaviour (TPB) model or establish the behavioural effect of changing those indicators through an intervention.

## 3.1 Analytical design and workflow

For each of the three road safety topics, analyses were conducted at two levels: (*i*) one pooled cross-national model containing respondents from all 31 included countries and (*ii*) 31 separate national models estimated using the same set of variables. This produced 32 models per topic and 96 regression models in total. The common analytical sequence

is summarised in Figure 3.1.

The sequence comprised: (1) construction and description of the common analytical sample; (2) theory-guided assignment of ESRA3 items to behavioural and socio-cognitive item sets; (3) derivation of PCA component scores; (4) descriptive analysis of the behavioural outcomes; (5) estimation of pooled and national linear regression models; (6) assessment of residual within-country correlation using GEE; and (7) descriptive comparison of standardised coefficients and model fit across countries and topics.

## 3.2 Analytical sample and weighting

The dissertation examines unsafe car-driving behaviour reported for the previous 30 days. The analytical sample was therefore restricted to respondents who reported driving a car at least a few days per month. This criterion reduced the likelihood of including respondents who had not driven during the behavioural reference period and is used throughout the dissertation to define *regular car drivers*.

Thirty-five respondents who selected the questionnaire response category "neither male nor female" were excluded because the population information required to calculate the corresponding national survey weights was unavailable. This exclusion was a weighting-related analytical decision and should not be interpreted as implying that these respondents were substantively irrelevant to road safety research.

Eight of the 39 ESRA3 countries were excluded from the dissertation analyses. The exclusion criteria were: (i) use of a survey mode other than the common online-panel design (Armenia, Kyrgyzstan, and Uzbekistan); (ii) fewer than 500 regular car drivers in the national analytical sample (Armenia, Colombia, Kazakhstan, Kyrgyzstan, Luxembourg, Peru, and Uzbekistan); or (iii) an extreme national weighting factor greater than 6.0 or less than 0.167 (Panama). Some countries met more than one criterion.

The 31 retained countries were:

- **Americas:** Brazil, Canada, Chile, Mexico, and the United States;
- **Asia–Oceania:** Australia, Israel, Japan, Thailand, and Türkiye;
- **Europe:** Austria, Belgium, Bosnia and Herzegovina, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Latvia, the Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

The final analytical sample comprised 23,669 regular car drivers. National survey weights were applied to reduce deviations from the national gender-by-age distributions used in ESRA3, based on United Nations population statistics. The construction and interpretation of these weights are described in Section 2.5.

## 3.3 Operationalisation of behavioural and socio-cognitive indicators

### 3.3.1 Theory-guided assignment of ESRA3 items

The analytical variables were organised separately for speeding, DUI, and mobile phone use while driving. For each topic, the dependent variable was a composite indicator of self-reported behaviour during the previous 30 days. The principal explanatory variables

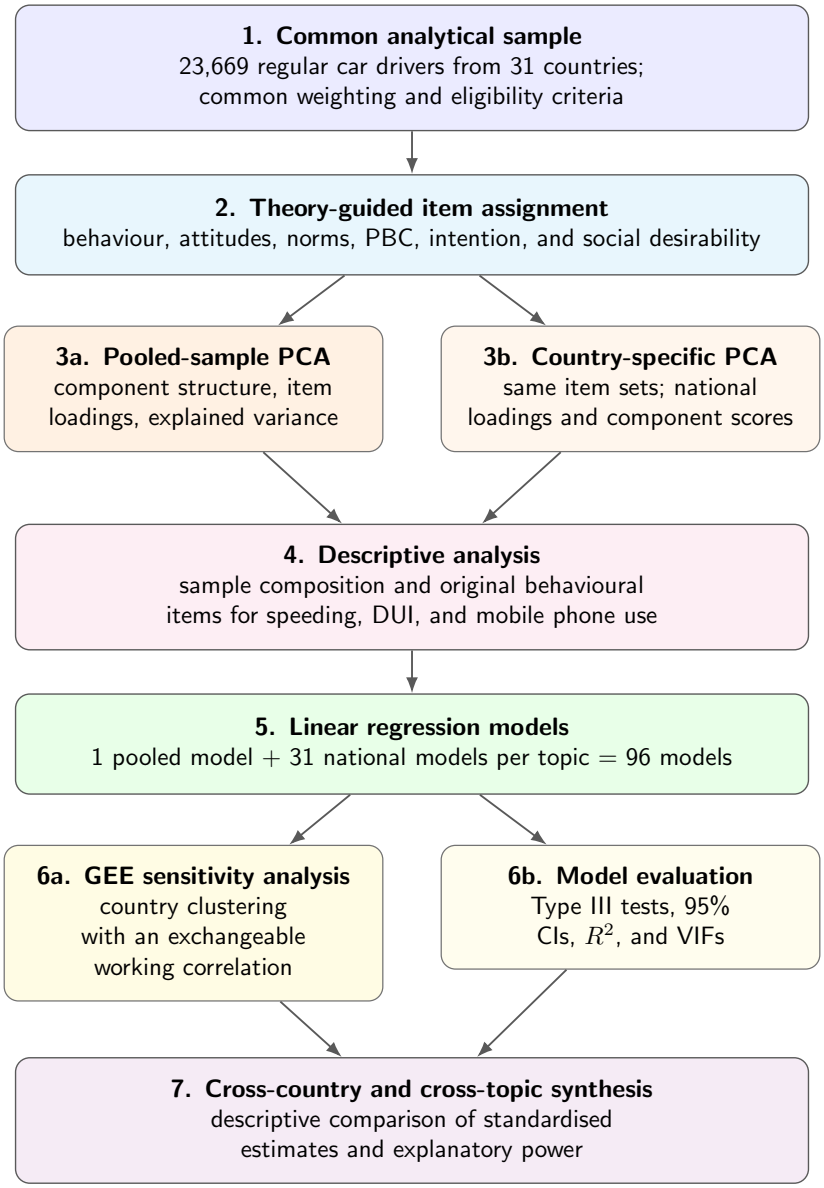



**Figure 3.1:** Analytical workflow applied to speeding, DUI, and mobile phone use while driving. PCA = principal component analysis; GEE = generalised estimating equations.

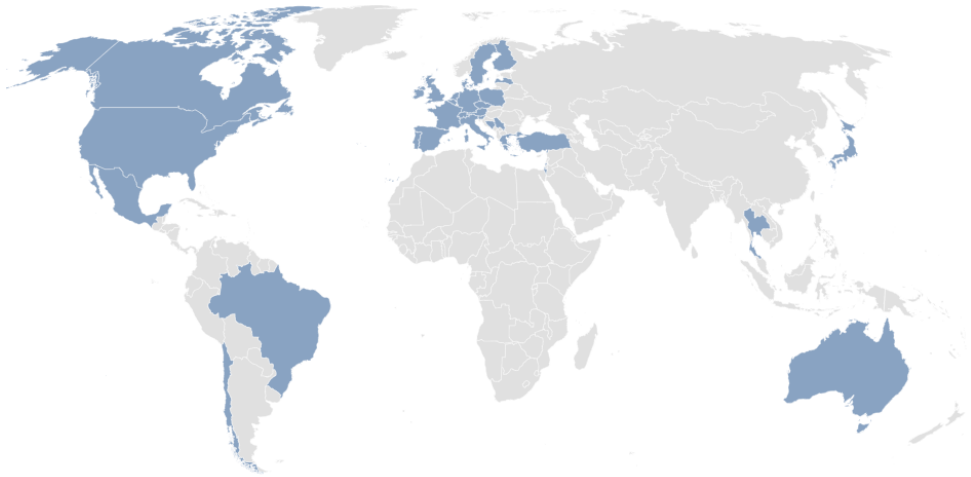


**Figure 3.2:** Geographical coverage of the 31 ESRA3 countries included in the dissertation analyses.

represented attitudes, norms, perceived behavioural control (PBC), and intention, organised using the TPB as a conceptual framework (Ajzen, 1991, 2020). The six-item Social Desirability–Gamma Short Scale (KSE-G) was included to account for two forms of socially desirable responding: exaggerating positive qualities and minimising negative qualities (Nießen et al., 2019).

The labels used in this dissertation require careful interpretation. The ESRA3 questionnaire was not designed as a complete validated TPB instrument. The indicators should consequently be understood as *TPB-inspired operationalisations* rather than direct measurements of latent TPB constructs. In particular:

- the **attitudes** indicator combines five risk-permissive statements covering DUI, speeding, and mobile phone use and therefore represents a broad orientation towards unsafe driving rather than a fully topic-specific attitude scale;

- the **norms** indicators combine perceived social acceptability with personal acceptability and are therefore broader than the conventional TPB concept of subjective norm;

- the **PBC** indicators primarily measure perceived capability or self-efficacy in performing or managing the unsafe behaviour; and

- **intention** is represented by one item per topic and is not a multi-item composite. Each intention item was transformed to a standardised $z$-score using the pooled analytical sample. This pooled transformation was retained in the national models, so the within-country standard deviation of intention need not equal one.

The two social-desirability indicators derive from the KSE-G subdimensions concerning exaggeration of positive qualities ($\mathrm{SDR_{PQ}}$) and minimisation of negative qualities ($\mathrm{SDR_{NQ}}$). The direction of the saved respondent scores must be distinguished from these subdimension labels. Higher $\mathrm{SDR_{PQ}}$ scores indicate stronger endorsement of positive qualities. The saved $\mathrm{SDR_{NQ}}$ score used in the regressions is positively oriented towards agreement with statements admitting negative qualities. Higher scores therefore indicate greater admission of negative qualities, rather than greater minimisation of those qualities.

### 3.3.2 Rationale for principal component analysis

PCA was used as a data-reduction procedure to summarise correlated observed items in respondent-level composite scores. PCA constructs linear combinations that successively account for the greatest possible proportion of total observed variance (Jolliffe & Cadima, 2016). This objective corresponds to the present study, which required compact composite indicators for subsequent regression analyses.

PCA should be distinguished from principal axis factoring (PAF) and other common-factor methods. Common-factor analysis seeks to explain the shared covariance among observed indicators through unobserved latent factors, whereas PCA summarises total observed variance (Fabrigar et al., 1999). The purpose of the present analysis was not to discover or validate latent TPB dimensions, estimate measurement error, or test a latent measurement model. PAF, confirmatory factor analysis, or structural equation modelling would therefore have addressed a different research objective. The choice of PCA is also consistent with the earlier ESRA2 analyses on which the dissertation builds (Meesmann et al., 2020).

The use of PCA does not by itself establish construct validity. The resulting component scores are empirical composite indicators whose substantive meaning is determined jointly by the prespecified item content, the component loadings, and the direction of the scoring. Throughout the dissertation, *component loading* refers to an item-level association with a retained principal component, whereas *component score* refers to the respondent-level variable entered into the regression models.

### 3.3.3 PCA procedure and cross-national implementation

PCA was performed separately for each prespecified behavioural or socio-cognitive item set. In the pooled analyses, the eigenvalue-greater-than-one criterion supported retention of one component for each item set reported in Tables 3.1–3.4. Because a single component was retained, rotation did not affect the solution, although Varimax rotation was specified in the SPSS syntax. Respondent-level component scores were calculated using the regression scoring method in SPSS Statistics 29 and saved for the subsequent regressions.

The pooled sample of 23,669 respondents was used to obtain the pooled-sample loadings and component scores. For the national models, the same item composition was retained, and PCA was repeated within each country. One component was retained for every national item set to maintain the same indicator structure across countries. The national loadings are reported in Appendices B–D.

Five distinct national item sets had a second eigenvalue slightly above one: mobile-phone norms in Greece and Serbia, broad attitudes in Israel and Slovenia, and self-reported DUI behaviour in Serbia. The second eigenvalues ranged from 1.010 to 1.049. In these cases, retaining one component was a harmonisation decision rather than a direct application of the eigenvalue-greater-than-one criterion. The broad attitudes indicator was common to the three behavioural models, so its national exceptions represent the same item set across topics.

This approach holds the conceptual item composition constant while allowing empirical item weights to vary between countries. The national indicators are therefore analogous, but they are not strictly identical measurement scales, and no formal measurement-invariance claim is made. Comparisons of national regression coefficients are descriptive

and should be interpreted alongside the item loadings, explained variance, confidence intervals, and broader measurement limitations.

A supplementary scoring comparison assesses the correspondence between the saved pooled component scores and arithmetic means of the same items (Appendix G). This comparison concerns the sensitivity of indicator construction to item weighting and does not validate latent TPB constructs.

### 3.3.4 Item composition and pooled-sample component loadings

Tables 3.1–3.4 present the ESRA3 items, response formats, pooled-sample component loadings, and percentage of variance explained for the retained components. Table 3.1 first reports the broad attitudes and social-desirability indicators that were common to all three road safety models. The subsequent tables report the behavioural outcome and topic-specific norms, PBC, and intention indicators for speeding, DUI, and mobile phone use while driving. Across all multi-item indicators, the explained variance ranged from 50.3% for the broad attitudes indicator to 72.9% for the PBC indicator concerning mobile phone use while driving.

#### Cross-topic indicators

Three indicators were common to the speeding, DUI, and mobile-phone-use models: the broad attitudes indicator and the two social-desirability indicators, SDR_PQ and SDR_NQ. These indicators were constructed from the same item sets in all three analyses and therefore had the same pooled-sample component loadings and explained variance across the road safety topics. They are consequently presented once in Table 3.1, rather than being repeated in each topic-specific table. The resulting component scores were entered unchanged as explanatory or control variables in each of the three topic-specific regression models.

#### Speeding

Table 3.2 presents the topic-specific item sets used for the speeding models. The self-reported speeding outcome combines four behaviours. The table further reports the speeding-specific norms and PBC components and the standardised intention item. The cross-topic attitudes and social-desirability indicators used in this model are reported separately in Table 3.1.

**Table 3.1:** ESRA3 items assigned to the cross-topic attitudes and social-desirability indicators, with pooled-sample PCA component loadings and explained variance (cross-national model).

| Construct | ESRA3 variable | Loading | % of variance |
|---|---|---|---|
| *Cross-topic attitudes* | | | |
| Attitudes[1] | To what extent do you agree with each of the following statements? | | 50.3 |
| | - For short trips, one can risk driving under the influence of alcohol. | 0.605 | |
| | - I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | |
| | - Respecting speed limits is boring or dull. | 0.631 | |
| | - I use a mobile phone while driving because I always want to be available. | 0.765 | |
| | - To save time, I often use a mobile phone while driving. | 0.776 | |
| *Social desirability* | | | |
| SDR_PQ[1] | To what extent do you agree with each of the following statements? | | 61.9 |
| | - In an argument, I always remain objective and stick to the facts. | 0.784 | |
| | - Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | |
| | - When talking to someone, I always listen carefully to what the other person says. | 0.797 | |
| SDR_NQ[1,2] | To what extent do you agree with each of the following statements? | | 54.5 |
| | - It has happened that I have taken advantage of someone in the past. | 0.768 | |
| | - I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | |
| | - Sometimes, I only help people if I expect to get something in return. | 0.732 | |

*Loading: principal component loading; SDR_PQ: KSE-G positive-quality subscale, scored towards greater endorsement of positive qualities; SDR_NQ: KSE-G negative-quality subscale, scored towards greater admission of negative qualities.*

[1] *Answered on a 5-point scale ranging from 1 'disagree' to 5 'agree'.*

[2] *The saved component score is positively oriented towards agreement with the displayed statements; higher scores indicate greater admission of negative qualities.*

**Table 3.2:** ESRA3 items assigned to self-reported speeding and related socio-cognitive indicators, with pooled-sample PCA component loadings and explained variance (cross-national model).

| Construct | ESRA3 variable | Loading | % of variance |
|---|---|---|---|
| *Dependent variable* | | | |
| Self-reported speeding[1] | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 |
| | - Drive faster than the speed limit inside built-up areas? | 0.865 | |
| | - Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | |
| | - Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | |
| | - Drive faster than the speed limit on motorways/freeways? | 0.856 | |
| *Socio-cognitive constructs* | | | |
| Norms[2] | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 |
| | - Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | |
| | - Drive faster than the speed limit inside built-up areas? | 0.845 | |
| | - Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | |
| | - Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | |
| | - Drive faster than the speed limit on motorways/freeways? | 0.862 | |
| PBC[3] | To what extent do you agree with each of the following statements? | | 71.2 |
| | - I trust myself when I drive significantly faster than the speed limit. | 0.856 | |
| | - I have the ability to drive significantly faster than the speed limit. | 0.866 | |
| | - I am able to drive fast through a sharp curve. | 0.808 | |
| Intention[3] | To what extent do you agree with each of the following statements? | | n.a. |
| | - I intend to respect speed limits in the next 30 days. | z-score | |

*Loading: principal component loading; PBC: perceived behavioural control. The common attitudes and social-desirability indicators are reported in Table 3.1.*

[1] *Answered on a 5-point scale ranging from 1 'never' to 5 '(almost) always'*

[2] *Answered on a 5-point scale ranging from 1 'unacceptable' to 5 'acceptable'*

[3] *Answered on a 5-point scale ranging from 1 'disagree' to 5 'agree'*

### DUI of alcohol, drugs or medication

Table 3.3 presents the topic-specific item sets used for the DUI models. The behavioural outcome combines self-reported driving after alcohol consumption, illegal drug use, and the use of potentially impairing medication. These behaviours are analytically combined in the dissertation but remain substantively heterogeneous and should therefore be interpreted as a broad DUI composite. The cross-topic attitudes and social-desirability indicators are reported in Table 3.1.

**Table 3.3:** ESRA3 items assigned to self-reported DUI and related socio-cognitive indicators, with pooled-sample PCA component loadings and explained variance (cross-national model).

| Construct | ESRA3 variable | Loading | % of variance |
|---|---|---|---|
| *Dependent variable* | | | |
| Self-reported DUI[1] | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 |
| | - Drive when you may have been over the legal limit for drinking and driving? | 0.869 | |
| | - Drive after drinking alcohol? | 0.827 | |
| | - Drive within 1 hour after taking drugs (other than prescribed or over-the-counter medication)? | 0.834 | |
| | - Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | |
| *Socio-cognitive constructs* | | | |
| Norms[2] | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 |
| | - Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | |
| | - Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | |
| | - Drive within 1 hour after taking drugs (other than prescribed or over-the-counter medication)? | 0.813 | |
| | - Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | |
| PBC[3] | To what extent do you agree with each of the following statements? | | 65.8 |
| | I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | |
| | I have the ability to drive when I am a little drunk after a party. | 0.869 | |
| | I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | |
| Intention[3] | To what extent do you agree with each of the following statements? | | n.a. |
| | - I intend not to drive after drinking alcohol in the next 30 days. | z-score | |

*Loading: principal component loading; PBC: perceived behavioural control. The common attitudes and social-desirability indicators are reported in Table 3.1.*

[1] *Answered on a 5-point scale ranging from 1 'never' to 5 '(almost) always'*

[2] *Answered on a 5-point scale ranging from 1 'unacceptable' to 5 'acceptable'*

[3] *Answered on a 5-point scale ranging from 1 'disagree' to 5 'agree'*

### Mobile phone use while driving

Table 3.4 presents the topic-specific item sets used for the mobile-phone models. The behavioural outcome combines handheld calling, hands-free calling, and reading messages or social media. Because these activities differ in legal status and in their visual, manual, and cognitive demands, the component represents an overall self-reported mobile-phone-use indicator rather than a single homogeneous action. The cross-topic attitudes and social-desirability indicators are reported in Table 3.1.

**Table 3.4:** ESRA3 items assigned to self-reported mobile phone use while driving and related socio-cognitive indicators, with pooled-sample PCA component loadings and explained variance (cross-national model).

| Construct | ESRA3 variable | Loading | % of variance |
|---|---|---|---|
| *Dependent variable* | | | |
| Self-reported mobile phone use[1] | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 |
| | - Talk on a hand-held mobile phone while driving? | 0.838 | |
| | - Talk on a hands-free mobile phone while driving? | 0.625 | |
| | - Read a message or check social media/news while driving? | 0.855 | |
| *Socio-cognitive constructs* | | | |
| Norms[2] | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 |
| | - Talk on a hand-held mobile phone while driving? | 0.829 | |
| | - Read a message or check social media/news while driving? | 0.811 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | |
| | - Talk on a hand-held mobile phone while driving? | 0.819 | |
| | - Talk on a hands-free mobile phone while driving? | 0.410 | |
| | - Read a message or check social media/news while driving? | 0.808 | |
| PBC[3] | To what extent do you agree with each of the following statements? | | 72.9 |
| | - I trust myself when I check messages on my mobile phone while driving. | 0.872 | |
| | - I have the ability to write a message on the mobile phone while driving. | 0.865 | |
| | - I am able to talk on a hand-held mobile phone while driving. | 0.823 | |
| Intention[3] | To what extent do you agree with each of the following statements? | | n.a. |
| | I intend not to use my mobile phone while driving in the next 30 days. | z-score | |

*Loading: principal component loading; PBC: perceived behavioural control. The common attitudes and social-desirability indicators are reported in Table 3.1.*

[1] *Answered on a 5-point scale ranging from 1 'never' to 5 '(almost) always'*

[2] *Answered on a 5-point scale ranging from 1 'unacceptable' to 5 'acceptable'*

[3] *Answered on a 5-point scale ranging from 1 'disagree' to 5 'agree'*

## 3.4 Statistical analysis

### 3.4.1 Descriptive analyses

The common analytical sample was first described by gender, age, education, urbanisation, driving frequency, and national sample size. Chapter 4 reports the pooled weighted distribution and the minimum, maximum, and median national values; detailed country-level sample characteristics are provided in Appendix E. For each road safety topic, descriptive statistics were also calculated for the original behavioural items contributing to the dependent component score.

### 3.4.2 Linear regression model specification

Linear regression was selected because the dependent variables were continuous PCA-derived component scores and the principal objective was to estimate transparent, adjusted linear associations using a common specification across topics and countries. The analysis was not intended to reproduce the full causal sequence proposed by the TPB, to estimate indirect effects through intention, or to correct explicitly for measurement error.

For respondent $i$, the general model can be written as:

$$Y_i = \alpha + \sum_{j=1}^{J} \beta_j X_{ij} + \sum_{k=1}^{K} \gamma_k D_{ik} + \varepsilon_i, \tag{3.1}$$

where $Y_i$ is the topic-specific behavioural component score, $X_{ij}$ denotes the continuous socio-cognitive and social-desirability variables, $D_{ik}$ denotes the dummy-coded socio-demographic and exposure variables, $\alpha$ is the intercept, and $\varepsilon_i$ is the respondent-specific error term.

Each model included the indicators for attitudes, norms, PBC, intention, $\text{SDR}_{\text{PQ}}$, and $\text{SDR}_{\text{NQ}}$. The control variables were gender, age group, education, urbanisation, and driving frequency. Driving frequency was included as an indicator of exposure because more frequent drivers have more opportunities to engage in the behaviours measured over the previous 30 days. The same predictor set and reference categories were used in the pooled and national models for each topic.

The pooled models estimate associations across the combined sample of 31 countries. The separate national models estimate the corresponding associations within each national sample. The pooled and national estimates answer complementary descriptive questions and should not be interpreted as interchangeable estimates of a single causal process.

### 3.4.3 Coefficient notation and interpretation

The dissertation uses $\beta_j$ for a population regression coefficient and $\widehat{\beta}_j$ for its estimated value. An estimated standardised coefficient is denoted by $\widehat{\beta}_j^*$, rather than by using Roman $B$ and Greek $\beta$ for two different coefficient types. Standardised coefficients were calculated to facilitate descriptive comparison of continuous socio-cognitive indicators measured on different composite-score scales (Bring, 1994).

For a continuous predictor, $\widehat{\beta}_j^*$ represents the estimated change in the dependent variable, expressed in standard-deviation units, associated with a one-standard-deviation increase in the predictor, conditional on the other variables in the model. Coefficients for

categorical variables represent adjusted differences from the stated reference category and are not used in the cross-topic ranking of socio-cognitive indicators.

For a continuous predictor, the relationship between the estimated unstandardised and standardised coefficients is

$$\widehat{\beta}_j^* = \widehat{\beta}_j \frac{s_{X_j}}{s_Y},$$

where $s_{X_j}$ and $s_Y$ are the weighted standard deviations of the predictor and outcome in the corresponding estimation sample. Standardising a variable in the pooled sample does not imply that its standard deviation equals one within each country. Consequently, the unstandardised and standardised national intention coefficients need not be numerically identical.

Unstandardised coefficient estimates are accompanied by 95% confidence intervals. Standardised coefficients are used principally for the cross-topic and cross-country comparison of attitudes, norms, PBC, and intention. Because statistical significance depends on both coefficient magnitude and precision, substantive interpretation is based on the estimates and confidence intervals rather than on $p$-values alone.

### 3.4.4 Partial tests, model fit, and multicollinearity

The adjusted contribution of each predictor was assessed using partial $F$-tests corresponding to Type III tests in the weighted linear regression models. Each test evaluates whether the coefficient or coefficients for a predictor are jointly equal to zero after adjustment for all other model terms. In the pooled models, the numerator degrees of freedom were two for age group and driving frequency and one for each remaining predictor; the denominator degrees of freedom were 23,655. Test statistics and $p$-values were obtained from the same model specification and residual variance estimate. Model fit was summarised using the coefficient of determination, $R^2$, describing the proportion of observed variance in the behavioural component score accounted for by the complete predictor set.

Multicollinearity was assessed using variance inflation factors (VIFs). All reported VIFs were below four. This value is used as a diagnostic indication that no predictor exhibited severe linear dependence with the remaining predictor set; it is not treated as an absolute universal threshold, because the practical consequences of a given VIF depend on the research design, sample size, and precision required (Allison, 1999; O'Brien, 2007).

### 3.4.5 Sensitivity analysis for within-country correlation

Respondents in the pooled data were grouped within countries, creating the possibility of residual within-country correlation. A Gaussian GEE model with an identity link and the same linear mean structure was used as a sensitivity analysis, with country as the clustering unit and an exchangeable working correlation structure (Liang & Zeger, 1986; Cools & Moons, 2016).

The exchangeable structure assumes one common average correlation between respondents within the same country. It provides a parsimonious diagnostic structure because respondents had no repeated-measure ordering within countries and the purpose was to assess whether meaningful average residual clustering remained after inclusion of the model covariates. The estimated working correlation was 0.0230 for speeding, 0.0278 for DUI, and 0.0226 for mobile phone use. These estimates indicate very small average residual correlations within countries. Therefore, ordinary linear regression models were therefore retained as the principal models.

This sensitivity analysis has a deliberately limited interpretation. A near-zero working correlation does not demonstrate that countries are substantively homogeneous, that national intercepts or slopes are identical, or that country-level contextual variables are unimportant. It indicates only that, for the fitted linear mean model, the estimated average residual association among respondents from the same country was very small. GEE was used for this diagnostic purpose rather than as a formal test of all possible multilevel structures.

### 3.4.6 Cross-topic and cross-country comparison

The final analytical step compared $\widehat{\beta}_j^*$ for attitudes, norms, PBC, and intention across the three road safety topics and 31 national samples. The comparisons were conducted descriptively using the same predictor set and broad model structure. The relative magnitude of coefficients was used to identify common and topic-specific patterns, while $R^2$ was used to compare the explanatory power of the complete models.

Numerical differences between coefficients from separate national models are not, by themselves, formal tests that the underlying population coefficients differ. Formal tests would require interaction terms, equality constraints, multigroup models, or another explicit heterogeneity procedure. Accordingly, the dissertation describes cross-national variation in the *estimated* coefficients and avoids interpreting every numerical difference as statistically established cultural heterogeneity.

The use of country-specific component scores creates an additional qualification: the same items and conceptual labels are used across countries, but the item weights can differ. Cross-national comparisons therefore concern analogous operational indicators rather than formally measurement-invariant latent constructs.

## 3.5 Software and reproducibility

Data preparation, principal component analyses, descriptive analyses, and linear regression modelling were performed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., 2022). Figures were produced using R version 4.3.2 (R Core Team, 2023) with the `ggplot2` package (Wickham, 2016). The Generalised Estimating Equations sensitivity analysis was conducted using SAS Foundation 9.4 (SAS Institute Inc., 2013). The analytical syntax and derived-variable definitions were retained to document the item coding, calculation of PCA-derived component scores, model specifications, and production of the reported results.

## 3.6 Chapter summary

The dissertation applies a common analytical strategy to three unsafe driving behaviours in a shared sample of 23,669 regular car drivers from 31 countries. Theory-guided item sets were summarised using PCA-derived component scores, with component loadings reported separately from respondent-level scores. Linear regression models estimated adjusted associations between the behavioural outcomes and TPB-inspired socio-cognitive indicators, while GEE was used as a sensitivity analysis for residual within-country correlation. Standardised coefficients and $R^2$ values were compared descriptively across topics

and countries, with explicit recognition that the analyses are associational, that the national component scores are not formally measurement invariant, and that numerical differences between separately estimated coefficients do not constitute formal tests of coefficient heterogeneity.

# Chapter 4

# Results

This chapter reports the empirical findings for the common analytical sample and for the three road-safety topics examined in the dissertation: speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving. The chapter first describes the weighted composition of the sample. Each topic-specific section then presents (*i*) descriptive statistics for the observed questionnaire items and (*ii*) the pooled cross-national and separate national regression results. The final section compares model fit and the estimated standardised coefficients across topics and countries.

The interpretation in this chapter is deliberately descriptive and associational. The notation $\widehat{\beta}_j$ denotes an estimated unstandardised regression coefficient and $\widehat{\beta}_j^*$ an estimated standardised coefficient. For the already standardised continuous component scores, these two estimates are numerically identical; for categorical predictors, the standardised estimate additionally depends on the coding and distribution of the predictor. Numerical differences between coefficients from separately estimated national models are reported descriptively and are not treated as formal tests of coefficient equality. Substantive interpretation, policy implications, and methodological limitations are developed in Chapter 5.

Appendix G reports a supplementary comparison between the saved pooled component scores and arithmetic mean item scores for all multi-item indicators.

## 4.1 Sample composition

The same analytical sample was used for all three road-safety topics. Table 4.1 presents the weighted distribution of gender, age, education, level of urbanisation, and driving frequency, together with the unweighted sample size. National weights adjusted the gender-by-age distribution towards the corresponding national population structure (United Nations Statistics Division, 2023). The sample was restricted to respondents who drove a car at least a few days per month and for whom a national survey weight could be calculated. The final analytical sample comprised 23,669 regular car drivers in 31 countries; national sample sizes ranged from 570 respondents in Japan to 1,421 in Austria.

The weighted gender distribution was relatively balanced, with men representing 53% of the pooled sample. Respondents aged 35–54 years formed the largest age group (40%), while the 18–34 and 55–74 age groups each represented approximately 30%. The age composition varied across countries: Japan had the largest proportion of respondents aged 55–74 years, whereas Brazil had the largest proportion aged 18–34 years.

Educational composition differed markedly between national samples. In the pooled sample, 55% of respondents reported a bachelor's degree or higher, with national propor-

tions ranging from 24% in Austria to 88% in Mexico. Most respondents lived in urban or semi-urban areas. The ESRA3 measure produced national proportions ranging from 57% in Belgium to 99% in Türkiye. These survey values should not be compared directly with external urban-population statistics because the underlying classifications differ (World Bank, 2023).

Driving frequency was included as an exposure-related covariate. Among the regular drivers retained for analysis, 61% reported driving at least four days per week, 26% reported driving one to three days per week, and 12% reported driving a few days per month. The national distributions and the country-specific contextual indicators are reported in Appendix E and in the ESRA3 country factsheets (ESRA Project, 2024).

**Table 4.1:** Sample composition.

| Parameter | Variable | All 31 countries | Range Min | Range Max | Median |
|---|---|---|---|---|---|
| Gender | Male | 53% | 49% (Ireland) | 59% (Serbia) | 52.8% |
| | Female | 47% | 41% (Serbia) | 51% (Ireland) | 47.2% |
| Age group | 18-34y | 30% | 18% (Japan) | 44% (Brazil) | 30.2% |
| | 35-54y | 40% | 34% (Sweden) | 47% (Spain) | 40.2% |
| | 55-74y | 30% | 17% (Türkiye) | 40% (Japan) | 31.4% |
| Education level | $\leq$ Secondary education | 45% | 12% (Mexico) | 76% (Austria) | 42.7% |
| | $\geq$ Bachelor | 55% | 24% (Austria) | 88% (Mexico) | 57.3% |
| Urbanisation level | Rural | 21% | 1% (Türkiye) | 43% (Belgium) | 17.0% |
| | Urban/Semi-urban | 79% | 57% (Belgium) | 99% (Türkiye) | 83.0% |
| Driving frequency | At least 4 days a week | 61% | 49% (Netherlands) | 78% (Bosnia Herzegovina) | 59.9% |
| | 1 to 3 days a week | 26% | 12% (Bosnia Herzegovina) | 37% (Netherlands) | 28.4% |
| | A few days a month | 12% | 8% (Italy) | 18% (Chile) | 12.0% |
| Sample size | | 23669 | 570 (Japan) | 1421 (Austria) | 700 |

## 4.2 Speeding

Section 4.2 builds on the submitted manuscript by Meesmann & Cools (2026). The results are presented using the harmonised variable definitions and analytical framework adopted throughout this dissertation. The descriptive context for speeding is supplemented by the ESRA3 Speeding thematic report by Harkin et al. (2024).

### 4.2.1 Descriptive results for self-reported speeding

The speeding component score used in the regression models was derived from four items referring to the previous 30 days. Table 4.2 reports the item means by country and the pooled mean and standard deviation. Responses ranged from 1 ('never') to 5 ('(almost) always'). The table presents the observed item distributions; the PCA-derived component score used in the regression models is described in Chapter 3.

In most countries, mean scores are relatively low, indicating that drivers generally comply with speed limits and adjust to traffic conditions. Speeding on motorways is the most frequently reported behaviour, followed by speeding outside built-up areas, and then within built-up areas. Driving too fast for road or traffic conditions (excessive speed) is reported least often in all countries.

**Table 4.2:** Descriptive statistics of self-reported speeding as a car driver by country.

| Country | Over the last 30 days, how often did you as a CAR DRIVER ... [1] | | | |
|---|---|---|---|---|
| | drive faster than the speed limit inside built-up areas | drive faster than the speed limit outside built-up areas (except motorways/freeways) | drive faster than the speed limit on motorways/freeways | drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users) |
| | Mean | Mean | Mean | Mean |
| *Americas* | | | | |
| Brazil | 1.62 | 1.69 | 1.75 | 1.40 |
| Canada | 1.92 | 2.08 | 2.29 | 1.46 |
| Chile | 1.76 | 1.74 | 1.80 | 1.51 |
| Mexico | 1.72 | 1.74 | 1.82 | 1.57 |
| United States | 1.60 | 1.72 | 1.88 | 1.41 |
| *Asia-Oceania* | | | | |
| Australia | 1.37 | 1.43 | 1.48 | 1.24 |
| Israel | 1.82 | 2.04 | 2.27 | 1.49 |
| Japan | 1.83 | 1.84 | 1.79 | 1.52 |
| Thailand | 1.69 | 1.81 | 1.74 | 1.65 |
| Türkiye | 1.34 | 1.56 | 1.61 | 1.39 |
| *Europe* | | | | |
| Austria | 2.05 | 2.36 | 2.34 | 1.67 |
| Belgium | 1.89 | 2.00 | 2.06 | 1.53 |
| Bosnia Herzegovina | 1.83 | 1.93 | 1.87 | 1.43 |
| Czech Republic | 2.02 | 2.25 | 2.01 | 1.54 |
| Denmark | 1.77 | 2.11 | 2.12 | 1.46 |
| Finland | 2.32 | 2.59 | 2.51 | 1.64 |
| France | 1.73 | 1.87 | 1.88 | 1.42 |
| Germany | 1.73 | 1.89 | 1.77 | 1.39 |
| Greece | 1.62 | 1.85 | 1.97 | 1.43 |
| Ireland | 1.73 | 1.93 | 1.96 | 1.48 |
| Italy | 1.58 | 1.83 | 1.75 | 1.41 |
| Latvia | 2.15 | 2.44 | 2.34 | 1.57 |
| Netherlands | 1.91 | 2.12 | 2.28 | 1.53 |
| Poland | 1.92 | 2.01 | 1.93 | 1.53 |
| Portugal | 2.01 | 2.11 | 2.18 | 1.48 |
| Serbia | 1.75 | 1.97 | 1.73 | 1.30 |
| Slovenia | 1.81 | 2.12 | 2.23 | 1.46 |
| Spain | 1.79 | 1.83 | 1.94 | 1.51 |
| Sweden | 1.81 | 2.28 | 2.39 | 1.46 |
| Switzerland | 1.67 | 1.94 | 2.13 | 1.43 |
| United Kingdom | 1.53 | 1.63 | 1.69 | 1.31 |
| *Pooled cross-national sample* | | | | |
| Mean | 1.79 | 1.97 | 2.01 | 1.48 |
| SD | 0.98 | 1.08 | 1.15 | 0.80 |
| Minimum | 1.34 | 1.43 | 1.48 | 1.24 |
| Maximum | 2.32 | 2.59 | 2.51 | 1.67 |

[1] *Answered on a 5-point scale ranging from 1 'never' to 5 '(almost) always'*

Among the behaviours examined in this dissertation, speed-limit violations were reported more frequently than DUI and hand-held mobile phone use; talking on a hands-free mobile phone was reported even more frequently and is legally permitted in many jurisdictions. The relatively high prevalence of self-reported speeding infractions as well as of self-reported hands-free mobile phone use, is strongly reflected in the high personal and perceived social acceptability (norms) of these behaviours in the ESRA3 survey (Meesmann et al., 2025b).

Finland shows the highest mean score for speeding across all road types, followed closely by Latvia, Austria, and Sweden. Australia and Türkiye report the lowest mean scores overall. Within the Americas, Canada shows comparably higher scores for speeding all road type, while Brazil and the United States are among the lower-scoring countries in that region, but the difference with the other American countries is small. European countries show considerable variation. While Finland, Latvia, and Austria consistently report higher speeding frequencies, countries such as the United Kingdom and Italy score low. Notably, driving too fast for road or traffic conditions is reported less frequently than speed limit violations in all countries.

### 4.2.2 Regression results

The pooled model and 31 national models estimated the adjusted associations between self-reported speeding and the common set of socio-demographic, exposure-related, socio-cognitive, and social-desirability variables. Table 4.3 reports the Type III tests for the pooled model, Table 4.4 reports its coefficient estimates, Figure 4.1 shows the $R^2$ values of the national models, and Figure 4.2 shows the national estimates for the four socio-cognitive indicators. All predictors specified in Chapter 3 were retained in each model; tables display a dash where the corresponding test was not statistically significant. Variance inflation factors were below 4 in all models.

The pooled speeding model had $R^2 = 0.58$. Across the 31 national models, $R^2$ ranged from 0.47 in Chile to 0.70 in the United States. These values describe differences in model fit; they do not by themselves identify the contextual or measurement mechanisms underlying those differences.

#### Socio-demographic and exposure-related variables

In the pooled speeding model, age, education, and driving frequency were statistically significant, whereas gender and level of urbanisation were not. Relative to drivers aged 55–74 years, drivers aged 18–34 years had a small negative coefficient ($\widehat{\beta}_j = -0.035$, $p < 0.05$). Respondents with secondary education or less had a small positive coefficient relative to those with a bachelor's degree or higher ($\widehat{\beta}_j = 0.021$, $p < 0.05$). Driving one to three days per week and driving at least four days per week were positively associated with self-reported speeding relative to driving a few days per month ($\widehat{\beta}_j = 0.085$ and 0.196, respectively; both $p < 0.001$). The corresponding standardised estimates were 0.037 and 0.096. Associations involving the socio-demographic variables were less consistent across the national models; the full national estimates are reported in Appendix F.

#### Socio-cognitive indicators and social desirability

In the pooled model, norms had the largest positive association with self-reported speeding ($F = 2980.142$, $\widehat{\beta}_j = 0.458$, $p < 0.001$). Norms also had the largest estimated coefficient

| Parameter | F Value | Pr > F |
|---|---|---|
| *Socio-demographic variables and exposure* | | |
| Gender | – | – |
| Age group | 4.283 | <0.050 |
| Education level | 2.536 | <0.050 |
| Urbanisation level | – | – |
| Driving frequency | 117.120 | <0.001 |
| *Socio-cognitive constructs* | | |
| Attitudes[1] | 454.613 | <0.001 |
| Norms | 2.980.142 | <0.001 |
| PBC | 420.702 | <0.001 |
| Intention | 159.218 | <0.001 |
| *Social desirability* | | |
| SDR_PQ | 19.820 | <0.001 |
| SDR_NQ | 47.645 | <0.001 |
| *Model Fit* | | |
| $R^2$ | 0.58 | |

[1] *Expanded to other road safety topics (e.g., DUI, mobile phone use)*
*– Included in the model but not significant ($p > 0.05$).*

**Table 4.3:** Type III analysis of effects on self-reported speeding as a car driver from the pooled model, including 31 countries (all constructs were included in the model, but only significant effects are presented).

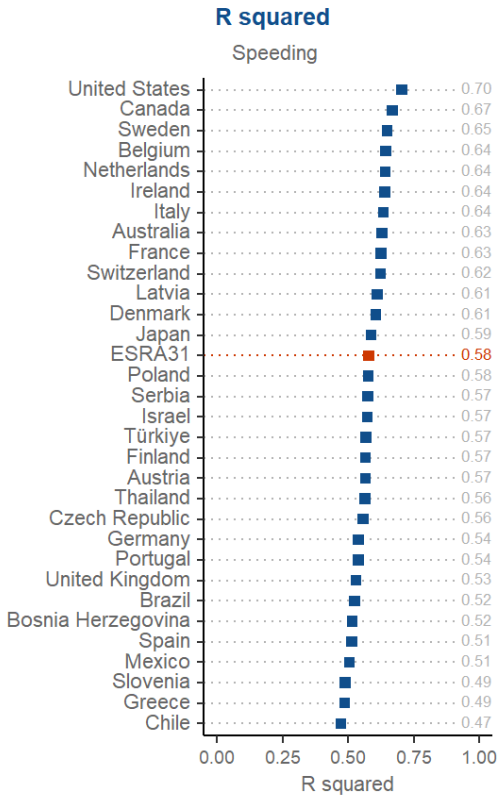



**Figure 4.1:** $R^2$ values of the 31 national linear regression models for self-reported speeding while driving a car by country.

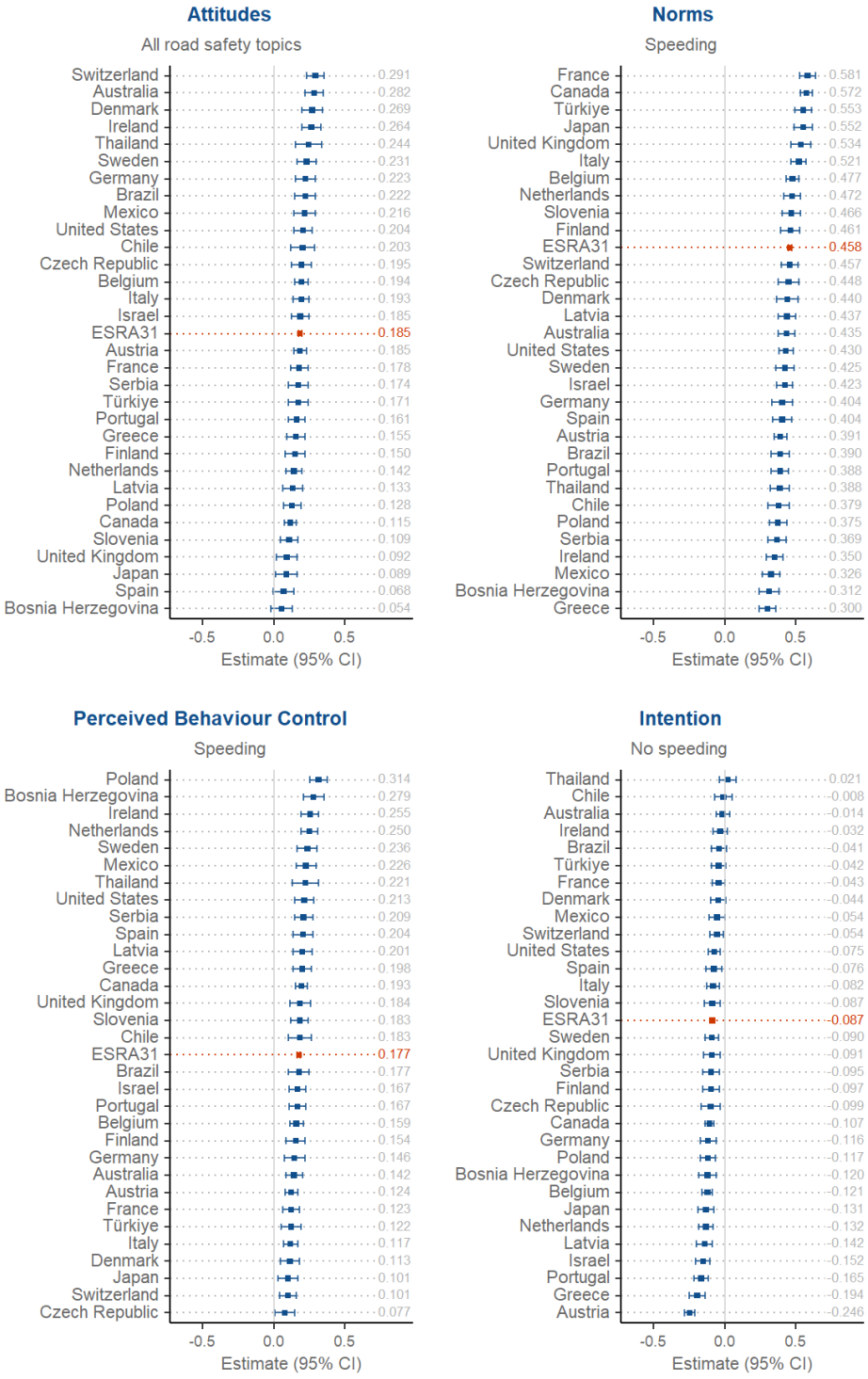



**Figure 4.2:** Estimated regression coefficients ($\widehat{\beta}_j$) of the selected socio-cognitive constructs in the 31 national linear regression models for self-reported speeding as a car driver, by country.

**Table 4.4:** Parameter estimates from the pooled linear regression model for self-reported speeding as a car driver in 31 countries (all constructs were included in the model, but only significant effects are presented).

| Parameter (reference category) | Estimated coefficient ($\widehat{\beta}_j$) | Standardised estimate ($\widehat{\beta}_j^*$) | 95% CI for $\widehat{\beta}_j$ | | $p$-value |
|---|---|---|---|---|---|
| Intercept | -0.148 | | -0.179 | -0.118 | < 0.001 |
| *Socio-demographic variables and exposure* | | | | | |
| Gender (Female) | | | | | |
| Male | -- | -- | -- | -- | -- |
| Age (55-74y) | | | | | |
| 35-54y | -- | -- | -- | -- | -- |
| 18-34y | -0.035 | -0.016 | -0.057 | -0.013 | < 0.050 |
| Education (≥ Bachelor) | | | | | |
| ≤ Secondary education | 0.021 | 0.011 | 0.004 | 0.038 | < 0.050 |
| Urbanisation level (Urban/Semi-urban) | | | | | |
| Rural | -- | -- | -- | -- | -- |
| Driving frequency (A few days a month) | | | | | |
| 1 to 3 days a week | 0.085 | 0.037 | 0.056 | 0.113 | < 0.001 |
| At least 4 days a week | 0.196 | 0.096 | 0.170 | 0.223 | < 0.001 |
| *Socio-cognitive constructs* | | | | | |
| Attitudes[1] | 0.185 | 0.185 | 0.174 | 0.196 | < 0.001 |
| Norms | 0.458 | 0.458 | 0.447 | 0.468 | < 0.001 |
| PBC | 0.177 | 0.177 | 0.166 | 0.188 | < 0.001 |
| Intention | -0.087 | -0.087 | -0.096 | -0.078 | < 0.001 |
| *Social desirability* | | | | | |
| SDR_PQ | -0.030 | -0.030 | -0.039 | -0.022 | < 0.001 |
| SDR_NQ | 0.050 | 0.050 | 0.040 | 0.059 | < 0.001 |

[1] *Expanded to other road safety topics (e.g., DUI, mobile phone use)*
*-- included in the model but not significant ($p > .05$).*

among the four socio-cognitive indicators in each national model, ranging from 0.300 in Greece to 0.581 in France. Attitudes were positively associated with speeding in the pooled model ($F = 454.613$, $\widehat{\beta}_j = 0.185$, $p < 0.001$); the national association was not statistically significant in Bosnia and Herzegovina or Spain. PBC was also positively associated with speeding ($F = 420.702$, $\widehat{\beta}_j = 0.177$, $p < 0.001$) and was statistically significant in all national models. Intention to respect the speed limit was negatively associated with self-reported speeding ($F = 159.218$, $\widehat{\beta}_j = -0.087$, $p < 0.001$), with statistically significant national estimates ranging from $-0.246$ in Austria to $-0.054$ in Switzerland.

The social-desirability indicators had comparatively small coefficients. Greater endorsement of positive qualities was negatively associated with reported speeding ($\widehat{\beta}_j = -0.030$), whereas greater admission of negative qualities was positively associated with reported speeding ($\widehat{\beta}_j = 0.050$); both associations had $p < 0.001$. Figure 4.2 and Table 4.11 show the descriptive variation in the national socio-cognitive estimates.

## 4.3 DUI of alcohol, drugs or medication

Section 4.3 builds on the earlier peer-reviewed ESRA2 analysis by Meesmann et al. (2020). The present dissertation extends this work using ESRA3 data, the common 31-country analytical sample, country-specific component scores, and the harmonised analytical framework applied across the three road safety topics. The descriptive context for DUI draws additionally on the ESRA3 thematic report by Meesmann et al. (2024).

### 4.3.1 Descriptive results for self-reported DUI

The DUI component score used in the regression models was derived from four items referring to the previous 30 days. Table 4.5 reports the item means by country and the pooled mean and standard deviation. Responses ranged from 1 ('never') to 5 ('(almost) always'). The table presents the observed item distributions; the PCA-derived component score used in the regression models is described in Chapter 3.

**Table 4.5:** Descriptive statistics of self-reported DUI involving alcohol, drugs, or medication while driving a car, by country.

| Country | Over the last 30 days, how often did you as a CAR DRIVER ... [1] | | | |
|---|---|---|---|---|
| | Drive when you may have been over the legal limit for drinking and driving? | Drive after drinking alcohol? | Drive within 1 hour after taking drugs other than prescribed or over-the-counter medication? | Drive within 2 hours after taking medication that may affect your driving ability? |
| | Mean | Mean | Mean | Mean |
| *Americas* | | | | |
| Brazil | 1.26 | 1.28 | 1.18 | 1.24 |
| Canada | 1.20 | 1.27 | 1.24 | 1.26 |
| Chile | 1.24 | 1.27 | 1.13 | 1.22 |
| Mexico | 1.31 | 1.40 | 1.19 | 1.31 |
| United States | 1.24 | 1.27 | 1.32 | 1.33 |
| *Asia–Oceania* | | | | |
| Australia | 1.14 | 1.20 | 1.16 | 1.19 |
| Israel | 1.12 | 1.12 | 1.08 | 1.17 |
| Japan | 1.06 | 1.06 | 1.03 | 1.11 |
| Thailand | 1.41 | 1.49 | 1.64 | 1.64 |
| Türkiye | 1.16 | 1.14 | 1.13 | 1.16 |
| *Europe* | | | | |
| Austria | 1.19 | 1.32 | 1.10 | 1.27 |
| Belgium | 1.30 | 1.35 | 1.15 | 1.23 |
| Bosnia and Herzegovina | 1.18 | 1.29 | 1.09 | 1.17 |
| Czech Republic | 1.11 | 1.08 | 1.07 | 1.17 |
| Denmark | 1.21 | 1.31 | 1.17 | 1.22 |
| Finland | 1.09 | 1.14 | 1.04 | 1.16 |
| France | 1.23 | 1.28 | 1.13 | 1.20 |
| Germany | 1.16 | 1.18 | 1.14 | 1.22 |
| Greece | 1.16 | 1.22 | 1.04 | 1.14 |
| Ireland | 1.16 | 1.18 | 1.19 | 1.24 |
| Italy | 1.22 | 1.28 | 1.15 | 1.23 |
| Latvia | 1.08 | 1.11 | 1.04 | 1.13 |
| Netherlands | 1.18 | 1.27 | 1.19 | 1.27 |
| Poland | 1.08 | 1.08 | 1.05 | 1.18 |
| Portugal | 1.17 | 1.39 | 1.11 | 1.17 |
| Serbia | 1.12 | 1.20 | 1.02 | 1.10 |
| Slovenia | 1.19 | 1.27 | 1.06 | 1.12 |
| Spain | 1.29 | 1.34 | 1.16 | 1.35 |
| Sweden | 1.16 | 1.15 | 1.14 | 1.21 |
| Switzerland | 1.26 | 1.33 | 1.13 | 1.19 |
| United Kingdom | 1.16 | 1.18 | 1.20 | 1.22 |
| *Pooled cross-national sample* | | | | |
| Mean | 1.19 | 1.25 | 1.14 | 1.22 |
| SD | 0.61 | 0.66 | 0.58 | 0.66 |
| Minimum | 1.06 | 1.06 | 1.02 | 1.10 |
| Maximum | 1.41 | 1.49 | 1.64 | 1.64 |

[1] *Answered on a 5-point scale ranging from 1 "never" to 5 "(almost) always".*

Across all countries and items, mean scores are consistently low, indicating that DUI behaviours are rarely reported. Driving after drinking alcohol is the most frequently reported behaviour, followed by driving within 2 hours after taking medication that may affect driving ability. DUI of drugs (other than prescribed or over-the-counter medication) is the least commonly reported behaviour overall. DUI is less frequently reported than

speeding or mobile phone use while driving in all countries.

Thailand reports the highest mean scores across all four items, particularly for drug and medication-related DUI, while Japan, Latvia, and Poland report the lowest mean scores. Within Europe, Belgium and Spain show relatively higher scores for drink driving, whereas Latvia, Finland, and Poland are among the lowest. In the Americas, Mexico reports the highest means across items, while Brazil, Chile, Canada, and the United States show broadly similar and comparably low scores.

### 4.3.2 Regression results

The pooled model and 31 national models estimated the adjusted associations between self-reported DUI and the common set of socio-demographic, exposure-related, socio-cognitive, and social-desirability variables. Table 4.6 reports the Type III tests for the pooled model, Table 4.7 reports its coefficient estimates, Figure 4.3 shows the $R^2$ values of the national models, and Figure 4.4 shows the national estimates for the four socio-cognitive indicators. All predictors specified in Chapter 3 were retained in each model; tables display a dash where the corresponding test was not statistically significant. Variance inflation factors were below 4 in all models.

| Parameter | $F$ value | $p$-value |
|---|---|---|
| *Socio-demographic variables and exposure* | | |
| Gender | – | – |
| Age group | – | – |
| Education level | 9.669 | <0.001 |
| Urbanisation level | – | – |
| Driving frequency | 10.111 | <0.001 |
| *Socio-cognitive constructs* | | |
| Attitudes[1] | 335.166 | <0.001 |
| Norms | 3193.747 | <0.001 |
| PBC | 684.415 | <0.001 |
| Intention | 95.134 | <0.001 |
| *Social desirability* | | |
| SDR_PQ | 13.144 | <0.001 |
| SDR_NQ | 116.476 | <0.001 |
| *Model fit* | | |
| $R^2$ | 0.50 | |

[1] *Expanded to other road safety topics (e.g., speeding and mobile phone use).*
– *Included in the model but not significant ($p > 0.05$).*

**Table 4.6:** Type III analysis of effects on self-reported DUI involving alcohol, drugs, or medication while driving a car in the pooled model covering 31 countries. All constructs were included in the model, but only statistically significant effects are presented.

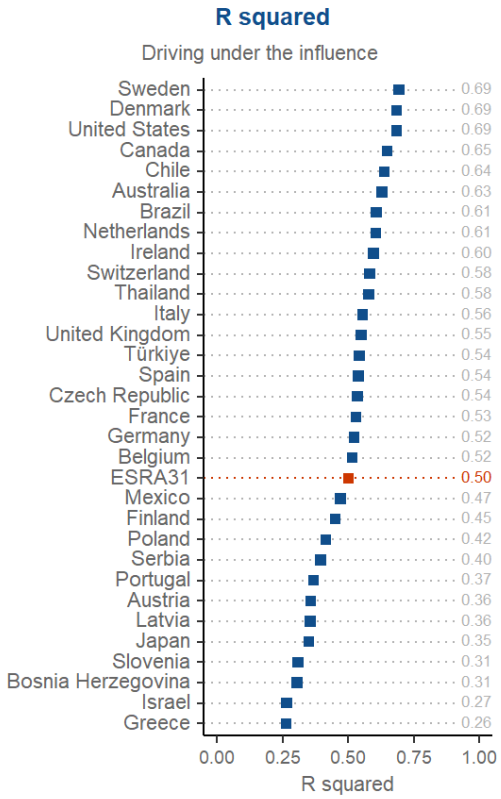



**Figure 4.3:** $R^2$ values of the 31 national linear regression models for self-reported DUI involving alcohol, drugs, or medication while driving a car, by country.

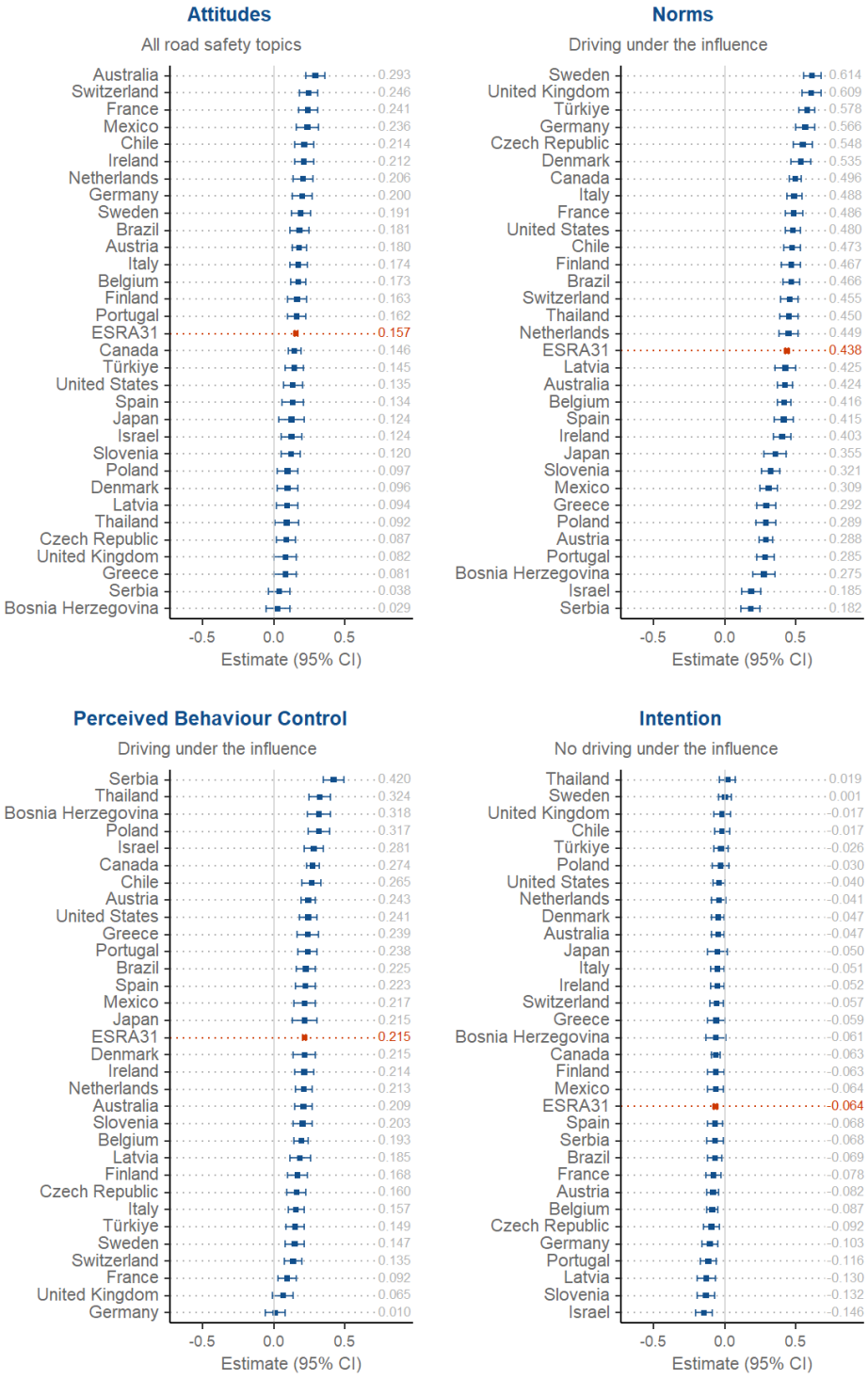



**Figure 4.4:** Estimated regression coefficients ($\widehat{\beta}_j$) of the selected socio-cognitive constructs in the 31 national linear regression models for self-reported DUI involving alcohol, drugs, or medication while driving a car, by country.

**Table 4.7:** Parameter estimates from the pooled linear regression model for self-reported DUI involving alcohol, drugs, or medication while driving a car in 31 countries (all constructs were included in the model, but only significant effects are presented).

| Parameter (reference category) | Estimated coefficient ($\widehat{\beta}_j$) | Standardised estimate ($\widehat{\beta}_j^*$) | 95% CI for $\widehat{\beta}_j$ | | $p$-value |
|---|---|---|---|---|---|
| Intercept | 0.037 | | 0.004 | 0.070 | < 0.050 |
| *Socio-demographic variables and exposure* | | | | | |
| Gender (Female) | | | | | |
| Male | -- | -- | -- | -- | -- |
| Age (55–74 years) | | | | | |
| 35–54 years | -- | -- | -- | -- | -- |
| 18–34 years | -- | -- | -- | -- | -- |
| Education (≥ bachelor's degree) | | | | | |
| ≤ Secondary education | -0.041 | -0.021 | -0.060 | -0.023 | < 0.001 |
| Urbanisation level (Urban/Semi-urban) | | | | | |
| Rural | -- | -- | -- | -- | -- |
| Driving frequency (A few days a month) | | | | | |
| 1 to 3 days a week | -- | -- | -- | -- | -- |
| At least 4 days a week | -- | -- | -- | -- | -- |
| *Socio-cognitive constructs* | | | | | |
| Attitudes[1] | 0.157 | 0.157 | 0.145 | 0.168 | < 0.001 |
| Norms | 0.438 | 0.438 | 0.427 | 0.448 | < 0.001 |
| PBC | 0.215 | 0.215 | 0.204 | 0.227 | < 0.001 |
| Intention | -0.064 | -0.064 | -0.073 | -0.055 | < 0.001 |
| *Social desirability* | | | | | |
| SDR_PQ | 0.024 | 0.024 | 0.015 | 0.033 | < 0.001 |
| SDR_NQ | 0.078 | 0.078 | 0.068 | 0.088 | < 0.001 |
| *Model fit* | | | | | |
| $R^2$ | 0.50 | | | | |

[1] *Expanded to other road safety topics (e.g., speeding and mobile phone use).*
*-- Included in the model but not statistically significant ($p > 0.05$).*

The pooled DUI model had $R^2 = 0.50$. Across the 31 national models, $R^2$ ranged from 0.26 in Greece to 0.69 in Sweden. These values describe differences in model fit and are interpreted further in Chapter 5.

### Socio-demographic and exposure-related variables

In the pooled DUI model, education and driving frequency were statistically significant at the effect level, whereas gender, age, and level of urbanisation were not. Respondents with secondary education or less had a lower estimated DUI component score than respondents with a bachelor's degree or higher ($\widehat{\beta}_j = -0.041$, $p < 0.001$; $\widehat{\beta}_j^* = -0.021$). Although the overall Type III test for driving frequency was significant ($F = 10.111$, $p < 0.001$), neither of the individual contrasts shown in Table 4.7 was statistically significant after adjustment. National estimates for the socio-demographic and exposure-related variables are provided in Appendix F and varied in significance and direction across countries.

### Socio-cognitive indicators and social desirability

Norms had the largest pooled association with self-reported DUI ($F = 3193.747$, $\widehat{\beta}_j = 0.438$, $p < 0.001$). Across the national models, the norms estimate ranged from 0.182 in Serbia to 0.614 in Sweden. Norms had the largest coefficient among the four socio-cognitive indicators in 27 countries; PBC had the largest coefficient in Bosnia and Herzegovina, Israel, Poland, and Serbia.

PBC was positively associated with DUI in the pooled model ($F = 684.415$, $\widehat{\beta}_j = 0.215$, $p < 0.001$). The association was not statistically significant in Germany or the United

Kingdom; among the statistically significant national estimates, it ranged from 0.092 in France to 0.420 in Serbia. Attitudes were also positively associated with DUI ($F = 335.166$, $\widehat{\beta}_j = 0.157$, $p < 0.001$). The national association was not statistically significant in Bosnia and Herzegovina or Serbia. Intention not to drive after drinking alcohol was negatively associated with DUI in the pooled model ($F = 95.134$, $\widehat{\beta}_j = -0.064$, $p < 0.001$) and was statistically significant in 19 national models.

Both social-desirability indicators were statistically significant in the pooled model, but their coefficients were small: $\widehat{\beta}_j = 0.024$ for greater endorsement of positive qualities and $\widehat{\beta}_j = 0.078$ for greater admission of negative qualities (both $p < 0.001$). Figure 4.4 and Table 4.11 show the descriptive variation in national estimates.

## 4.4 Mobile phone use while driving

Section 4.4 builds on the peer-reviewed analysis of mobile phone use while driving by Meesmann et al. (2025a). The results are presented within the harmonised analytical framework used for speeding and DUI, thereby supporting the cross-topic comparison in Section 4.5. The descriptive context for mobile phone use while driving draws additionally on the ESRA3 thematic report on distraction and fatigue by Areal et al. (2024).

### 4.4.1 Descriptive results for mobile phone use while driving

The mobile-phone component score used in the regression models was derived from three items referring to the previous 30 days. Table 4.8 reports the item means by country and the pooled mean and standard deviation. Responses ranged from 1 ('never') to 5 ('(almost) always'). The table presents the observed item distributions; the PCA-derived component score used in the regression models is described in Chapter 3.

Across all countries, the use of hands-free mobile phones while driving is by far the most frequently reported behaviour, with a cross-national mean of 2.26, compared to 1.43 for hand-held phone use and 1.42 for reading messages or checking social media. This pattern is consistent across virtually all countries, likely reflecting the legal status of hands-free use in most jurisdictions. Hand-held phone use and reading messages or checking social media show very similar mean scores across the sample.

Israel reports the highest mean for hands-free phone use, followed by Portugal, Latvia, and Austria, while Japan and Türkiye report the lowest scores for this behaviour. For hand-held phone use, Thailand reports the highest mean, followed by Bosnia and Herzegovina, Finland and Latvia, while Japan and Australia report the lowest. Reading messages or checking social media follows a similar pattern, with Mexico and Thailand scoring highest and Australia and the United Kingdom the lowest.

Within Europe, Bosnia and Herzegovina, Finland, and Latvia show relatively higher scores for hand-held phone use, while the Netherlands and the United Kingdom are among the lowest. For hands-free use, Portugal, Latvia, and Austria report the highest means in Europe, whereas France and the United Kingdom score lowest on this item. In the Americas, Chile and Mexico report comparatively higher scores across the three mobile phone items, while Canada and the United States report lower mean scores. Brazil occupies a middle position between these countries.

**Table 4.8:** Descriptive statistics of self-reported mobile phone use while driving a car, by country.

| Country | Over the last 30 days, how often did you as a CAR DRIVER ... [1] | | |
|---|---|---|---|
| | Talk on a hand-held mobile phone while driving? | Talk on a hands-free mobile phone while driving? | Read a message or check social media/news while driving? |
| | Mean | Mean | Mean |
| *Americas* | | | |
| Brazil | 1.51 | 1.90 | 1.56 |
| Canada | 1.35 | 1.99 | 1.39 |
| Chile | 1.52 | 2.50 | 1.59 |
| Mexico | 1.62 | 2.40 | 1.66 |
| United States | 1.49 | 1.89 | 1.42 |
| *Asia–Oceania* | | | |
| Australia | 1.22 | 1.81 | 1.24 |
| Israel | 1.33 | 2.95 | 1.55 |
| Japan | 1.21 | 1.71 | 1.26 |
| Thailand | 1.88 | 2.44 | 1.64 |
| Türkiye | 1.48 | 1.71 | 1.34 |
| *Europe* | | | |
| Austria | 1.50 | 2.62 | 1.50 |
| Belgium | 1.29 | 2.36 | 1.38 |
| Bosnia and Herzegovina | 1.73 | 2.14 | 1.51 |
| Czech Republic | 1.42 | 2.08 | 1.34 |
| Denmark | 1.32 | 2.01 | 1.44 |
| Finland | 1.68 | 2.13 | 1.57 |
| France | 1.35 | 1.79 | 1.32 |
| Germany | 1.29 | 1.97 | 1.33 |
| Greece | 1.61 | 2.26 | 1.45 |
| Ireland | 1.37 | 2.42 | 1.46 |
| Italy | 1.32 | 2.56 | 1.37 |
| Latvia | 1.67 | 2.77 | 1.42 |
| Netherlands | 1.24 | 2.16 | 1.30 |
| Poland | 1.45 | 2.51 | 1.39 |
| Portugal | 1.37 | 2.82 | 1.50 |
| Serbia | 1.51 | 2.31 | 1.34 |
| Slovenia | 1.41 | 2.56 | 1.35 |
| Spain | 1.36 | 2.27 | 1.39 |
| Sweden | 1.50 | 2.38 | 1.48 |
| Switzerland | 1.37 | 2.27 | 1.41 |
| United Kingdom | 1.27 | 1.80 | 1.24 |
| *Pooled cross-national sample* | | | |
| Mean | 1.43 | 2.26 | 1.42 |
| SD | 0.83 | 1.39 | 0.80 |
| Minimum | 1.21 | 1.71 | 1.24 |
| Maximum | 1.88 | 2.95 | 1.66 |

[1] *Answered on a 5-point scale ranging from 1 "never" to 5 "(almost) always".*

### 4.4.2 Regression results

The pooled model and 31 national models estimated the adjusted associations between self-reported mobile phone use while driving and the common set of socio-demographic, exposure-related, socio-cognitive, and social-desirability variables. Table 4.9 reports the Type III tests for the pooled model, Table 4.10 reports its coefficient estimates, Figure 4.5 shows the $R^2$ values of the national models, and Figure 4.6 shows the national estimates for the four socio-cognitive indicators. All predictors specified in Chapter 3 were retained in each model; tables display a dash where the corresponding test was not statistically significant. Variance inflation factors were below 4 in all models.

| Parameter | $F$ value | $p$-value |
|---|---|---|
| *Socio-demographic variables and exposure* | | |
| Gender | – | – |
| Age group | 35.598 | <0.001 |
| Education level | 3.959 | <0.050 |
| Urbanisation level | – | – |
| Driving frequency | 122.373 | <0.001 |
| *Socio-cognitive constructs* | | |
| Attitudes[1] | 660.493 | <0.001 |
| Norms | 1267.940 | <0.001 |
| PBC | 976.052 | <0.001 |
| Intention | 55.195 | <0.001 |
| *Social desirability* | | |
| SDR_PQ | 3.754 | <0.050 |
| SDR_NQ | 13.091 | <0.001 |
| *Model fit* | | |
| $R^2$ | 0.52 | |

[1] *Expanded to other road safety topics (e.g., speeding, DUI, and seat belt use).*
– *Included in the model but not significant ($p > 0.05$).*

**Table 4.9:** Type III analysis of effects on self-reported mobile phone use while driving a car in the pooled model covering 31 countries. All constructs were included in the model, but only statistically significant effects are presented.

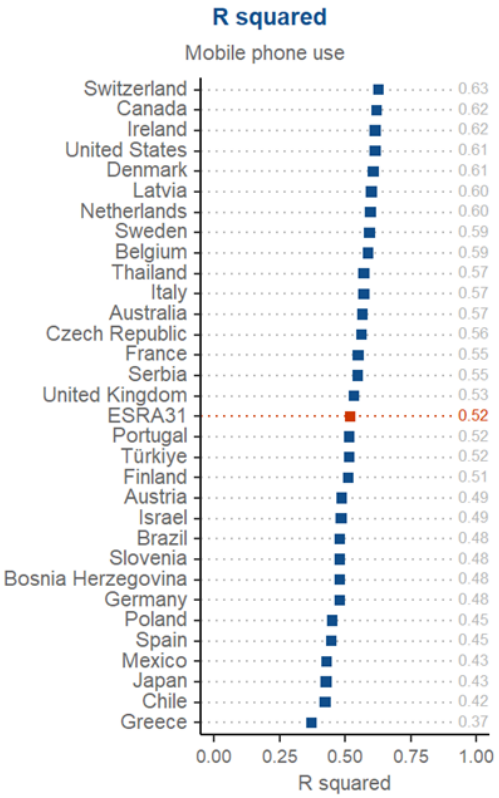



**Figure 4.5:** $R^2$ values of the 31 national linear regression models for self-reported mobile phone use while driving a car, by country.

The pooled mobile-phone model had $R^2 = 0.52$. Across the 31 national models, $R^2$ ranged from 0.37 in Greece to 0.63 in Switzerland. These values describe differences in model fit and are interpreted further in Chapter 5.

#### Socio-demographic and exposure-related variables

In the pooled mobile-phone model, age, education, and driving frequency were statistically significant, whereas gender and level of urbanisation were not. Relative to drivers aged 55–74 years, drivers aged 35–54 and 18–34 years had positive coefficients of 0.089 and 0.087, respectively (both $p < 0.001$). Respondents with secondary education or less

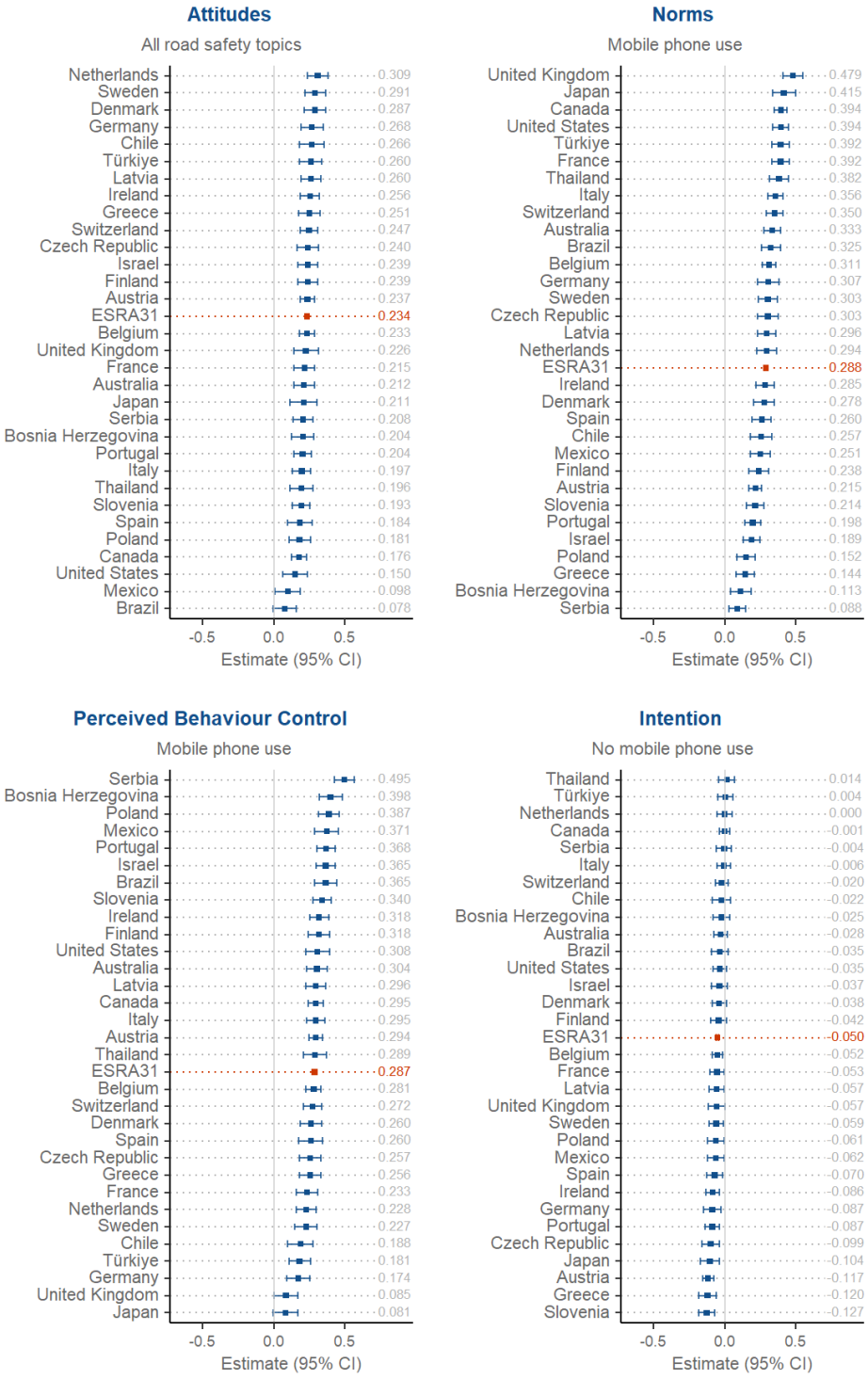



**Figure 4.6:** Estimated regression coefficients ($\widehat{\beta}_j$) of the selected socio-cognitive constructs in the 31 national linear regression models for self-reported mobile phone use while driving a car, by country.

**Table 4.10:** Parameter estimates from the pooled linear regression model for self-reported mobile phone use while driving a car in 31 countries (all constructs were included in the model, but only significant effects are presented).

| Parameter (reference category) | Estimated coefficient ($\widehat{\beta}_j$) | Standardised estimate ($\widehat{\beta}_j^*$) | 95% CI for $\widehat{\beta}_j$ | | $p$-value |
|---|---|---|---|---|---|
| Intercept | -0.178 | | -0.211 | -0.146 | $< 0.001$ |
| *Socio-demographic variables and exposure* | | | | | |
| Gender (Female) | | | | | |
| Male | -- | -- | -- | -- | -- |
| Age (55–74 years) | | | | | |
| 35–54 years | 0.089 | 0.043 | 0.067 | 0.111 | $< 0.001$ |
| 18–34 years | 0.087 | 0.040 | 0.063 | 0.111 | $< 0.001$ |
| Education ($\geq$ bachelor's degree) | | | | | |
| $\leq$ Secondary education | -0.027 | -0.013 | -0.045 | -0.008 | $< 0.050$ |
| Urbanisation level (Urban/Semi-urban) | | | | | |
| Rural | -- | -- | -- | -- | -- |
| Driving frequency (A few days a month) | | | | | |
| 1 to 3 days a week | 0.072 | 0.032 | 0.042 | 0.103 | $< 0.001$ |
| At least 4 days a week | 0.194 | 0.094 | 0.166 | 0.222 | $< 0.001$ |
| *Socio-cognitive constructs* | | | | | |
| Attitudes[1] | 0.234 | 0.234 | 0.222 | 0.247 | $< 0.001$ |
| Norms | 0.288 | 0.288 | 0.277 | 0.299 | $< 0.001$ |
| PBC | 0.287 | 0.287 | 0.274 | 0.299 | $< 0.001$ |
| Intention | -0.050 | -0.050 | -0.059 | -0.041 | $< 0.001$ |
| *Social desirability* | | | | | |
| SDR_PQ | 0.013 | 0.013 | 0.004 | 0.022 | $< 0.050$ |
| SDR_NQ | 0.026 | 0.026 | 0.016 | 0.036 | $< 0.001$ |
| *Model fit* | | | | | |
| $R^2$ | 0.52 | | | | |

[1] *Expanded to other road safety topics (e.g., speeding and DUI).*
*-- Included in the model but not statistically significant ($p > 0.05$).*

had a small negative coefficient relative to respondents with a bachelor's degree or higher ($\widehat{\beta}_j = -0.027$, $p < 0.05$). Driving one to three days per week and driving at least four days per week were positively associated with reported mobile phone use relative to driving a few days per month ($\widehat{\beta}_j = 0.072$ and 0.194, respectively; both $p < 0.001$). The full national estimates are reported in Appendix F.

### Socio-cognitive indicators and social desirability

Norms and PBC had nearly identical pooled coefficients for self-reported mobile phone use while driving: $\widehat{\beta}_j = 0.288$ for norms and $\widehat{\beta}_j = 0.287$ for PBC (both $p < 0.001$). The corresponding Type III tests were $F = 1267.940$ for norms and $F = 976.052$ for PBC. Norms were statistically significant in all 31 national models, with estimates ranging from 0.088 in Serbia to 0.479 in the United Kingdom. PBC was not statistically significant in Japan; the largest national PBC estimate was observed in Serbia (0.495), while the smallest statistically significant estimate was observed in the United Kingdom (0.085).

The broad attitudes indicator was positively associated with mobile phone use in the pooled model ($F = 660.493$, $\widehat{\beta}_j = 0.234$, $p < 0.001$). The national association was not statistically significant in Brazil; the statistically significant estimates ranged from 0.098 in Mexico to 0.309 in the Netherlands. Intention not to use a mobile phone while driving was negatively associated with the outcome ($F = 55.195$, $\widehat{\beta}_j = -0.050$, $p < 0.001$) and was statistically significant in 18 national models.

The social-desirability coefficients were small: $\widehat{\beta}_j = 0.013$ for greater endorsement of positive qualities ($p < 0.05$) and $\widehat{\beta}_j = 0.026$ for greater admission of negative qualities ($p < 0.001$). Figure 4.6 and Table 4.11 show the descriptive variation in national estimates.

## 4.5 Cross-topic comparison

The three topic-specific analyses used the same sample, covariate set, and general modelling strategy. Table 4.11 therefore supports a structured descriptive comparison of the estimated standardised coefficients, $\widehat{\beta}_j^*$, and $R^2$ values. The table does not constitute a formal test that coefficients are equal across topics or countries.

Across the pooled models, speeding had the highest $R^2$ (0.58), followed by mobile phone use (0.52) and DUI (0.50). Across all national models and topics, $R^2$ ranged from 0.26 for the Greek DUI model to 0.70 for the United States speeding model. The range was 0.47–0.70 for speeding, 0.26–0.69 for DUI, and 0.37–0.63 for mobile phone use.

Norms had the largest pooled standardised coefficient for speeding (0.458) and DUI (0.438). For mobile phone use, norms and PBC had nearly identical coefficients (0.288 and 0.287, respectively). The PBC coefficients were 0.177 for speeding and 0.215 for DUI. The attitudes coefficients were 0.185 for speeding, 0.157 for DUI, and 0.234 for mobile phone use. Intention had the smallest absolute pooled coefficient in each model and was negative for all three topics: −0.087 for speeding, −0.064 for DUI, and −0.050 for mobile phone use.

The national estimates show both recurring and topic-specific patterns. Norms had the largest socio-cognitive coefficient in every national speeding model and in 27 of the 31 DUI models. For mobile phone use, norms, PBC, and attitudes were more similar in magnitude, and their ordering varied more between countries. Table 4.11 provides the numerical basis for the substantive interpretation developed in Chapter 5.

**Table 4.11:** Estimated standardised coefficients ($\widehat{\beta}_j^*$) for socio-cognitive constructs and $R^2$ values from the cross national and 31 national regression models for self-reported speeding, DUI, and mobile phone use while driving a car, by country.

| | | Speeding | | | | | DUI of alcohol, drugs or medication | | | | | Mobile phone use | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Attitudes $\widehat{\beta}_j^*$ | Norms $\widehat{\beta}_j^*$ | PBC $\widehat{\beta}_j^*$ | Intention $\widehat{\beta}_j^*$ | $R^2$ | Attitudes $\widehat{\beta}_j^*$ | Norms $\widehat{\beta}_j^*$ | PBC $\widehat{\beta}_j^*$ | Intention $\widehat{\beta}_j^*$ | $R^2$ | Attitudes $\widehat{\beta}_j^*$ | Norms $\widehat{\beta}_j^*$ | PBC $\widehat{\beta}_j^*$ | Intention $\widehat{\beta}_j^*$ | $R^2$ |
| Pooled cross-national model | | 0.185 | 0.458 | 0.177 | -0.087 | 0.579 | 0.157 | 0.438 | 0.215 | -0.064 | 0.502 | 0.234 | 0.288 | 0.287 | -0.050 | 0.518 |
| Americas | Brazil | 0.222 | 0.390 | 0.177 | -0.041 | 0.525 | 0.181 | 0.466 | 0.225 | -0.069 | 0.608 | 0.078 | 0.325 | 0.365 | -0.035 | 0.480 |
| | Canada | 0.115 | 0.572 | 0.193 | -0.109 | 0.668 | 0.146 | 0.496 | 0.274 | -0.065 | 0.650 | 0.176 | 0.394 | 0.295 | -0.001 | 0.621 |
| | Chile | 0.203 | 0.379 | 0.183 | -0.008 | 0.472 | 0.214 | 0.473 | 0.265 | -0.017 | 0.638 | 0.266 | 0.257 | 0.188 | -0.022 | 0.425 |
| | Mexico | 0.216 | 0.326 | 0.226 | -0.054 | 0.505 | 0.236 | 0.309 | 0.217 | -0.064 | 0.471 | 0.098 | 0.251 | 0.371 | -0.063 | 0.430 |
| | United States | 0.204 | 0.430 | 0.213 | -0.074 | 0.705 | 0.135 | 0.480 | 0.241 | -0.040 | 0.686 | 0.150 | 0.394 | 0.308 | -0.035 | 0.615 |
| Asia-Oceania | Australia | 0.282 | 0.435 | 0.142 | -0.014 | 0.629 | 0.293 | 0.424 | 0.209 | -0.047 | 0.629 | 0.212 | 0.333 | 0.304 | -0.028 | 0.566 |
| | Israel | 0.185 | 0.423 | 0.167 | -0.153 | 0.574 | 0.124 | 0.185 | 0.281 | -0.146 | 0.265 | 0.239 | 0.189 | 0.365 | -0.037 | 0.484 |
| | Japan | 0.089 | 0.552 | 0.101 | -0.131 | 0.589 | 0.124 | 0.355 | 0.215 | -0.050 | 0.350 | 0.211 | 0.415 | 0.081 | -0.104 | 0.427 |
| | Thailand | 0.244 | 0.388 | 0.221 | 0.021 | 0.565 | 0.092 | 0.450 | 0.324 | 0.019 | 0.579 | 0.196 | 0.382 | 0.289 | 0.014 | 0.572 |
| | Türkiye | 0.171 | 0.553 | 0.122 | -0.042 | 0.569 | 0.145 | 0.578 | 0.149 | -0.026 | 0.543 | 0.260 | 0.392 | 0.181 | 0.004 | 0.517 |
| Europe | Austria | 0.185 | 0.391 | 0.124 | -0.247 | 0.567 | 0.180 | 0.288 | 0.243 | -0.083 | 0.358 | 0.237 | 0.215 | 0.294 | -0.117 | 0.488 |
| | Belgium | 0.194 | 0.477 | 0.159 | -0.122 | 0.644 | 0.173 | 0.416 | 0.193 | -0.088 | 0.516 | 0.233 | 0.311 | 0.281 | -0.052 | 0.588 |
| | Bosnia Herzegovina | 0.054 | 0.312 | 0.279 | -0.121 | 0.516 | 0.029 | 0.275 | 0.318 | -0.061 | 0.305 | 0.204 | 0.113 | 0.398 | -0.025 | 0.479 |
| | Czech Republic | 0.195 | 0.448 | 0.077 | -0.099 | 0.557 | 0.087 | 0.548 | 0.160 | -0.092 | 0.535 | 0.240 | 0.303 | 0.257 | -0.099 | 0.561 |
| | Denmark | 0.269 | 0.440 | 0.113 | -0.045 | 0.605 | 0.096 | 0.535 | 0.215 | -0.047 | 0.686 | 0.287 | 0.278 | 0.260 | -0.038 | 0.608 |
| | Finland | 0.150 | 0.461 | 0.154 | -0.097 | 0.567 | 0.163 | 0.467 | 0.168 | -0.063 | 0.450 | 0.239 | 0.238 | 0.318 | -0.042 | 0.513 |
| | France | 0.178 | 0.581 | 0.123 | -0.043 | 0.626 | 0.241 | 0.486 | 0.092 | -0.078 | 0.531 | 0.215 | 0.392 | 0.233 | -0.053 | 0.549 |
| | Germany | 0.223 | 0.404 | 0.146 | -0.118 | 0.540 | 0.200 | 0.566 | 0.010 | -0.104 | 0.524 | 0.268 | 0.307 | 0.174 | -0.088 | 0.479 |
| | Greece | 0.155 | 0.300 | 0.198 | -0.195 | 0.488 | 0.081 | 0.292 | 0.239 | -0.059 | 0.264 | 0.251 | 0.144 | 0.256 | -0.120 | 0.369 |
| | Ireland | 0.264 | 0.350 | 0.255 | -0.032 | 0.641 | 0.212 | 0.403 | 0.214 | -0.052 | 0.598 | 0.256 | 0.285 | 0.318 | -0.086 | 0.614 |
| | Italy | 0.193 | 0.521 | 0.117 | -0.082 | 0.635 | 0.174 | 0.488 | 0.157 | -0.051 | 0.556 | 0.197 | 0.356 | 0.295 | -0.006 | 0.571 |
| | Latvia | 0.133 | 0.437 | 0.201 | -0.142 | 0.612 | 0.094 | 0.425 | 0.185 | -0.130 | 0.355 | 0.260 | 0.296 | 0.296 | -0.057 | 0.599 |
| | Netherlands | 0.142 | 0.472 | 0.250 | -0.133 | 0.642 | 0.206 | 0.449 | 0.213 | -0.042 | 0.605 | 0.309 | 0.294 | 0.228 | 0.000 | 0.597 |
| | Poland | 0.128 | 0.375 | 0.314 | -0.117 | 0.578 | 0.097 | 0.289 | 0.317 | -0.030 | 0.415 | 0.181 | 0.152 | 0.387 | -0.061 | 0.453 |
| | Portugal | 0.161 | 0.388 | 0.167 | -0.165 | 0.539 | 0.162 | 0.285 | 0.238 | -0.116 | 0.369 | 0.204 | 0.198 | 0.368 | -0.087 | 0.518 |
| | Serbia | 0.174 | 0.369 | 0.209 | -0.095 | 0.575 | 0.038 | 0.182 | 0.420 | -0.068 | 0.396 | 0.208 | 0.088 | 0.495 | -0.004 | 0.549 |
| | Slovenia | 0.109 | 0.466 | 0.183 | -0.087 | 0.490 | 0.120 | 0.321 | 0.203 | -0.132 | 0.309 | 0.193 | 0.214 | 0.340 | -0.127 | 0.483 |
| | Spain | 0.068 | 0.404 | 0.204 | -0.076 | 0.513 | 0.134 | 0.415 | 0.223 | -0.068 | 0.539 | 0.184 | 0.260 | 0.260 | -0.071 | 0.446 |
| | Sweden | 0.231 | 0.425 | 0.236 | -0.091 | 0.650 | 0.191 | 0.614 | 0.147 | 0.001 | 0.695 | 0.291 | 0.303 | 0.227 | -0.059 | 0.593 |
| | Switzerland | 0.291 | 0.457 | 0.101 | -0.054 | 0.624 | 0.246 | 0.455 | 0.135 | -0.057 | 0.583 | 0.247 | 0.350 | 0.272 | -0.020 | 0.625 |
| | United Kingdom | 0.092 | 0.534 | 0.184 | -0.092 | 0.530 | 0.082 | 0.609 | 0.065 | -0.017 | 0.551 | 0.226 | 0.479 | 0.085 | -0.057 | 0.532 |

## 4.6 Chapter summary

The results show recurring associations between the TPB-inspired indicators and the three self-reported behaviours, alongside substantial descriptive variation in coefficient magnitude and model fit across countries. Norms had the largest pooled coefficient for speeding and DUI, while norms and PBC had nearly identical pooled coefficients for mobile phone use. The broad attitudes indicator had its largest pooled coefficient in the mobile-phone model. Intention was negatively associated with all three outcomes but had the smallest absolute pooled coefficient.

The supplementary comparison in Appendix G showed close correspondence between pooled component scores and arithmetic mean item scores, with weighted correlations ranging from 0.9630 to approximately 1.0000. This comparison concerns score construction rather than validation of latent TPB constructs and does not establish that regression estimates would remain unchanged under alternative scoring.

The next chapter interprets these patterns in relation to Traffic Safety Culture, the measurement strategy, and the limits of cross-sectional self-report data.

# Chapter 5

# Discussion

This chapter interprets the findings for speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving. The discussion addresses the four research questions formulated in Chapter 1, compares the three road-safety topics, and considers what the results contribute to the study of Traffic Safety Culture (TSC). It then discusses the strengths and limitations of the research design and develops priorities for future research.

The topic-specific discussions in Section 5.1 build on the scientific outputs underpinning the corresponding analyses: the submitted speeding manuscript by Meesmann & Cools (2026) for Section 5.1.1, the earlier peer-reviewed DUI study by Meesmann et al. (2020) for Section 5.1.2, and the peer-reviewed mobile phone study by Meesmann et al. (2025a) for Section 5.1.3. The cross-topic synthesis in Section 5.2, particularly the discussion of TSC monitoring and road safety outcomes in Section 5.2.4, additionally draws on the submitted cross-national study by Meesmann et al. (2026). Section 5.3 builds on the methodological considerations and limitations documented in the ESRA3 methodology and synthesis reports (Meesmann & Wardenier, 2024; Meesmann et al., 2025b).

The speeding results discussed here are unchanged from those reported in the submitted manuscript. The mobile phone results differ slightly from the published article because the intention indicator is standardised in the present dissertation to ensure consistency across the three road safety topics. The DUI discussion likewise reflects the harmonised model used throughout this dissertation rather than the habits-inclusive specification and three-item operationalisation of intention used in the earlier ESRA2 analysis. These adaptations allow the three topics to be interpreted within a common analytical framework and support the cross-topic synthesis developed in Section 5.2.

The interpretation is intentionally associational rather than causal. The analyses identify adjusted relationships between self-reported behaviour and TPB-inspired indicators within a cross-sectional survey. These relationships can help identify and prioritise candidate behavioural mechanisms for further formative research, but they do not estimate the behavioural change that would result from modifying a particular indicator. Likewise, differences between coefficients from separately estimated national models are treated as descriptive patterns rather than as formal tests that effects differ statistically between countries. These distinctions are essential when translating the findings into theoretical or policy conclusions.

## 5.1 Discussion by road-safety topic

### 5.1.1 Speeding

#### Main findings

The pooled speeding model explained 58% of the variance in the speeding component score, while the national $R^2$ values ranged from 0.47 to 0.70. The four socio-cognitive indicators were associated with speeding in the pooled model, and broadly comparable patterns were observed in the national models. Norms had the largest adjusted association in every national speeding model, whereas intention had the smallest absolute association in the pooled model and in most national models.

These findings answer the first two research questions affirmatively in an associational sense: the TPB-inspired indicators were related to self-reported speeding in the pooled sample and within each national sample. The third research question is answered descriptively: the magnitude of the estimates and the explanatory power of the models varied across countries. The fourth research question is addressed through the cross-topic synthesis in Section 5.2.

Recent reviews provide a useful external benchmark for this pattern. A speeding-specific literature review and meta-analysis concluded that the original TPB constructs remain relevant, but that moral norm and past behaviour add explanatory value and should be considered when interpreting persistent speed-limit violations (Rachad et al., 2024). The broader meta-analysis of risky driving by Somoray et al. (2024) similarly found that the predictive ordering of the TPB constructs is not fixed across behaviours and study designs. The relatively high explanatory power of the ESRA3 speeding models should therefore be understood as evidence that the selected indicators collectively capture an important part of self-reported speeding, rather than as evidence that the four indicators exhaust the behavioural mechanism.

#### Interpreting the prominence of norms

The prominence of norms differs from the ordering commonly reported in TPB meta-analyses, in which attitudes are often more strongly related to intention or behaviour than subjective norms (Armitage & Conner, 2001; Somoray et al., 2024; Hai et al., 2024). It would nevertheless be premature to conclude that the findings contradict the TPB. The ESRA3 norms indicator is broader than the canonical subjective-norm construct described by Ajzen (1991). It combines personal acceptability with perceived social acceptability and therefore captures both an individual's own normative evaluation and perceptions of what others consider acceptable. This operationalisation represents a broad acceptability indicator rather than a narrow measure of perceived social pressure.

The distinction matters substantively. Speeding is frequent, often normalised, and may be interpreted differently from more strongly stigmatised behaviours such as DUI. The ESRA3 synthesis report shows that speeding is among the most commonly reported unsafe driving behaviours across countries and that its perceived acceptability varies meaningfully between national contexts (Meesmann et al., 2025b; Pires et al., 2025). A broad indicator combining personal and social acceptability is therefore likely to be closely aligned with the behavioural outcome. The large coefficient for norms should consequently be interpreted as evidence that normative acceptance and self-reported speeding covary strongly, not as proof that social pressure alone causes speeding.

The result is compatible with broader TSC approaches, which treat shared norms, values, beliefs, and behavioural expectations as mechanisms through which groups define what is normal or legitimate in traffic (Ward et al., 2019; Nævestad et al., 2019, 2026). Research involving risky riding also shows that social approval, perceived behaviour of others, attitudes, and perceived control can jointly shape intentions and behaviour (Chorlton et al., 2012; Sumit et al., 2025). These studies support the relevance of the socio-cognitive domain while also illustrating that the importance of individual constructs depends on how they are measured and on the behaviour and population under study.

The recent speeding literature further suggests that several kinds of normative influence should be distinguished. Subjective or injunctive norms concern perceived approval by important others, descriptive norms concern perceptions of what other drivers actually do, and moral norms concern whether obeying the speed limit is experienced as a personal obligation. These dimensions may reinforce one another, but they need not produce identical associations with intention or behaviour. The ESRA3 norms component partly combines personal and perceived social acceptability and may consequently absorb variance that more specialised studies distribute across injunctive, descriptive, and moral-norm measures.

Past behaviour is another likely contributor to the strong norms–speeding relationship. Repeated speeding can become an expected part of ordinary driving and may progressively alter what the driver regards as normal, acceptable, or controllable. Conversely, a permissive normative environment can facilitate repetition and habit formation. Cross-sectional data cannot separate these reciprocal pathways, but the recent speeding meta-analysis indicates that past behaviour is sufficiently important that its omission may leave both normative and attitudinal coefficients carrying part of its association (Rachad et al., 2024).

### Attitudes, perceived behavioural control, and intention

Attitudes and PBC made smaller but consistent contributions to the speeding models. The attitudes indicator represents a broad risk-permissive orientation across several road-safety topics rather than a multi-item, behaviour-specific evaluation of speeding. Its coefficient may therefore underestimate the association that would be observed with a dedicated speeding-attitude scale. This point is important when comparing the present findings with studies that operationalise attitudes using multiple beliefs about the advantages and disadvantages of speeding.

PBC should also be interpreted cautiously. In a standard TPB application, PBC concerns perceived capability and control over performing or refraining from a behaviour. The ESRA3 items primarily reflect confidence in one's ability to manage risky behaviour or its consequences. For speeding, a positive association may therefore represent confidence in controlling the vehicle while travelling too fast rather than confidence in complying with speed limits. The indicator is better described as a topic-specific perceived-capability or self-efficacy measure than as a complete representation of behavioural control.

Intention was negatively associated with speeding, as expected from the wording of the item, but its absolute coefficient was comparatively small. Several design features can explain this pattern. First, the intention item concerns the next 30 days, whereas behaviour is reported for the previous 30 days. The measures therefore do not refer to the same behavioural period. Second, intention is measured with one item, which restricts reliability and content coverage. Third, a cross-sectional design cannot establish whether intention precedes behaviour. Past behaviour may influence current intentions through

learning, rationalisation, or attempts at self-regulation. The weak coefficient should thus not be read as evidence that motivation is irrelevant to speeding; it more directly raises questions about the temporal and psychometric alignment of the intention measure.

A complementary interpretation is that compliance involves both deliberate intention and regulatory processes that operate when immediate incentives favour speeding. Recent research comparing speeding and mobile phone use found that stronger internal regulation was associated with lower engagement in both behaviours, whereas external regulation was related to the perceived certainty of apprehension (Watson-Brown et al., 2024). This distinction helps explain why a single prospective intention item may add relatively little once acceptance, perceived capability, driving frequency, and established behaviour are already represented. A respondent can sincerely intend to comply while still lacking the self-regulatory routines required to maintain compliance in familiar, time-pressured, or socially permissive situations.

### Cross-national variation and implications

The national models reveal variation in coefficient magnitudes and model fit, but that variation has several possible sources. Some of it may reflect genuine contextual differences in enforcement, road design, speed-limit credibility, vehicle technology, mobility patterns, and the social meaning of speeding. Some may also reflect sampling variability, response styles, translation, and differences in how the component scores were constructed in each country. Because the national coefficients were estimated separately and were not compared through formal interaction tests or a multigroup model, rankings of countries should be avoided.

The results can be used to identify and prioritise context-specific candidate mechanisms for intervention development. Where normative acceptance is particularly strongly associated with speeding, normative mechanisms such as perceived normality and social approval become logical priorities for formative research and intervention design. Where attitudes or perceived capability are comparatively prominent, risk beliefs, perceived benefits of speeding, or confidence in controlling a speeding vehicle warrant greater attention. These priorities should inform, rather than determine, the final intervention mix and should be combined with observed speed data, exposure, enforcement indicators, crash patterns, existing intervention evidence, and local qualitative knowledge.

Within a Safe System perspective, communication is only one component of speed management. Normative or attitudinal measures should complement credible speed limits, self-explaining and forgiving roads, enforcement, vehicle technologies such as Intelligent Speed Assistance, and organisational accountability. The role of exposure must also be recognised: driving frequency was the most consistent socio-demographic correlate of speeding, which is compatible with the general principle that opportunities for unsafe behaviour increase with exposure (Van den Bossche et al., 2005).

Recent work on Intelligent Speed Assistance illustrates how socio-cognitive analysis can be linked to system design. In a study of drivers without ISA, attitudes were central to intentions both to activate the system and to override it, while subjective norms were relevant to activation intentions (Özkan et al., 2024). This finding shows that introducing a technological safeguard does not remove the cultural and motivational dimension: drivers still interpret the technology in terms of usefulness, autonomy, convenience, legitimacy, and the expectations of others. For the present dissertation, the implication is that strong normative associations with speeding are relevant not only for communication but also for the acceptance and sustained use of technical countermeasures.

### 5.1.2 Driving under the influence of alcohol, drugs or medication

#### Main findings

The pooled DUI model explained 50% of the variance in the DUI component score. National model fit varied more widely than for speeding, ranging from 0.26 to 0.69. Norms had the largest coefficient in the pooled model and in 27 of the 31 national models. PBC had the largest coefficient in Bosnia and Herzegovina, Israel, Poland, and Serbia. Attitudes were positively associated with DUI, while intention not to drive after drinking was negatively but comparatively weakly associated with the outcome.

The broad pattern is consistent with the earlier ESRA2 analysis by Meesmann et al. (2020), which found that socio-cognitive indicators contributed meaningfully to cross-national models of self-reported DUI. The ESRA3 results extend that work through a larger harmonised design and through direct comparison with speeding and mobile phone use within the same analytical sample.

The results are also consistent with a recent systematic review and meta-analysis of drink-driving intentions. That review found that TPB variables explained drink-driving intention comparatively well, whereas evidence for deterrence variables, particularly perceived sanction risk, was more ambiguous and less consistently studied (Love et al., 2024). This does not diminish the importance of enforcement. Rather, it indicates that enforcement is interpreted through individual experience, perceived legitimacy, perceived likelihood of detection, prior offending, and existing attitudes toward the behaviour. The ESRA3 finding that norms dominate the pooled model is therefore compatible with an integrated account in which formal deterrence and informal normative control interact.

#### Normative condemnation and residual tolerance

DUI is legally restricted and strongly condemned in many countries. Against that background, variation in personal or perceived social acceptability may distinguish a relatively small group of respondents who regard impaired driving as more tolerable. The large coefficient for norms is therefore theoretically plausible. It does not imply that most respondents consider DUI acceptable; rather, even limited differences in tolerance may be strongly associated with whether respondents report the behaviour.

This interpretation also highlights a limitation of the composite outcome. The DUI component combines behaviour after alcohol, illicit drugs, and medication. These behaviours differ in prevalence, legal status, social meaning, impairment mechanisms, and opportunities for occurrence. A common component is useful for constructing a broad indicator, but it may conceal topic-specific mechanisms. Norms relating to drink-driving may be more established than norms relating to prescription medication, while perceived control may have different meanings for alcohol, recreational drugs, and medicines. Future work should therefore test whether the pooled DUI pattern is reproduced when the behaviours are analysed separately.

Earlier European evidence already demonstrated that norms operate at more than one level. In a multilevel analysis of 19 countries, perceived drink-driving by friends was positively associated with self-reported drink-driving at the individual level, while countries with a higher prevalence of permissive peer norms also showed more drink-driving; countries conducting more alcohol checks showed lower national prevalence (Meesmann et al., 2015). This is especially relevant to the present findings because it shows how informal culture and formal enforcement can coexist rather than compete as explanations.

A country can have strong legal condemnation while particular peer networks continue to normalise the behaviour.

Recent evidence on simultaneous alcohol and cannabis use provides further support for distinguishing normative dimensions and substance-specific behaviours. Among young adults, more permissive injunctive norms were associated with driving under the simultaneous influence of alcohol and cannabis and with riding with an impaired driver, while descriptive norms showed a more selective relationship (Hultgren et al., 2024). The implication is that the broad ESRA3 norms component may identify a general tolerance of impaired driving, but it cannot reveal whether respondents are responding to perceived approval, perceived prevalence, peer-group practices, or personal moral acceptance.

### Perceived control as overconfidence

The positive association between PBC and DUI requires particular care. It should not be interpreted as evidence that people with greater actual control are more likely to drive while impaired. The items more plausibly capture confidence in one's ability to drive safely after consuming alcohol, drugs, or medication. The association may therefore reflect overconfidence, underestimation of impairment, or beliefs that personal skill can compensate for substance-related performance decrements. Earlier research has documented the relevance of perceived invulnerability and overconfidence in risky driving decisions (Jonah, 1990; McKenna, 1993; Chan et al., 2010).

The four countries in which PBC exceeded norms are substantively interesting, but they should not be treated as a definitive cultural typology. The estimates may reflect genuine differences in beliefs, but also differences in scale composition, precision, or reporting. The appropriate conclusion is that overconfidence-related beliefs deserve closer investigation in these settings. Experimental or simulator studies, qualitative interviews, and behaviour-specific surveys could test whether drivers who report higher PBC systematically underestimate impairment or whether the indicator captures another belief.

Substance-specific research also suggests that perceived impairment is not uniform. A 2024 systematic review and meta-analysis found that attitudes toward driving after cannabis use were generally unfavourable, but that a substantial minority did not hold clearly negative views and that attitudes were more permissive among cannabis-using samples (Boicu et al., 2024). This heterogeneity is directly relevant to the interpretation of PBC. Confidence in driving after prescribed medication, alcohol, or cannabis may arise from different beliefs about dose, tolerance, legality, medical need, and personal experience. Combining these behaviours can therefore produce a strong general component while masking the distinct belief structures that would need to be addressed in prevention.

### Implications for intervention design

The results provide an evidence-informed basis for prioritising normative mechanisms alongside measures that reduce opportunities to drive while impaired. Where residual tolerance is strongly associated with behaviour, normative communication becomes a plausible target for intervention development. Effective DUI prevention nevertheless also depends on legislation, visible enforcement, alcohol interlocks, transport alternatives, organisational policies, and the perceived probability of detection. Campaign-design guidance emphasises that communication objectives should be derived from a diagnosis of the target behaviour and evaluated rather than assumed to work solely because a psychosocial correlate is statistically significant (Delhomme et al., 2009).

Where overconfidence appears prominent, the national models provide a basis for prioritising this mechanism in formative research and intervention development, for example by examining whether drivers misjudge the discrepancy between perceived and actual performance. The present observational models do not estimate how much DUI would change if PBC were modified, and any intervention challenging confidence would require careful design and evaluation in the specific context. The national coefficients should therefore be used as evidence-informed inputs for target selection rather than as estimates of intervention effects.

The large variation in $R^2$ suggests that the four socio-cognitive indicators capture DUI more completely in some countries than in others. Unmeasured determinants may include alcohol and drug consumption patterns, enforcement visibility, access to public transport or designated drivers, nightlife geography, vehicle access, legal thresholds, and social inequalities. The importance of exposure again appears in the consistent association with driving frequency, but driving frequency alone is an incomplete measure of exposure to situations in which DUI may occur.

The recent deterrence literature therefore supports a layered intervention logic. General deterrence can alter the perceived probability and consequences of detection; specific deterrence can affect people who have already been sanctioned; normative strategies can challenge residual approval and perceptions of peer prevalence; and opportunity-reducing measures can make an impaired trip less likely to occur. The systematic review by Love et al. (2024) argues for more integrated and better contextualised models because no single deterrence or psychosocial variable adequately explains drink-driving intentions across studies. The country-specific ESRA3 coefficients can contribute to such contextualisation by helping to prioritise which psychosocial mechanisms deserve closer attention in a given setting. This prioritisation should be combined with data on actual enforcement intensity, sanction certainty, substance-use settings, and the availability of safe alternatives.

### 5.1.3 Mobile phone use while driving

#### Main findings

The pooled mobile-phone model explained 52% of the variance in the mobile-phone-use component score, and national $R^2$ values ranged from 0.37 to 0.63. Norms and PBC had nearly identical coefficients in the pooled model, while attitudes were also prominent. Intention was again the weakest of the four socio-cognitive indicators. The national ordering of norms, PBC, and attitudes varied more than for speeding or DUI.

These findings reproduce the main pattern reported in the peer-reviewed ESRA3 analysis by Meesmann et al. (2025a). They also align with broader evidence that mobile phone use while driving is influenced by social expectations, perceived capability, attitudes, habitual communication demands, and driving context (Cuentas-Hernandez et al., 2024; Sullman et al., 2018).

The prominence of norms is supported by a systematic review focused on young drivers. The review found a recurrent mismatch in which young drivers perceived frequent peer engagement in mobile phone use while driving despite generally perceiving disapproval of the behaviour; both descriptive and injunctive norms were associated with engagement, although the evidence base was still small (Nicolls et al., 2022). A subsequent mixed-method study likewise found that young drivers tended to believe that peers approved of and engaged in handheld phone use more than they themselves did, and that perceived norms were associated with self-reported engagement (Nicolls et al., 2024). These findings

reinforce the interpretation that normative influence is not a single construct. Drivers may disapprove of phone use in principle while simultaneously believing that it is common, expected, and tolerated in practice.

### A behaviour shaped by normalisation and perceived capability

The near-equal coefficients for norms and PBC are theoretically meaningful. Mobile phone use is embedded in everyday communication, work, navigation, and social availability. Drivers may recognise the general danger of distraction while simultaneously believing that a short glance, message, or call is manageable in a particular situation. The PBC indicator may therefore capture confidence in multitasking or in selecting supposedly safe moments to use a phone.

This interpretation is supported by research showing that mobile-phone use varies with task and traffic context and that drivers do not always accurately assess the performance costs of distraction. It is also consistent with evidence that legislation alone does not guarantee knowledge or compliance. Jamson (2013) showed that relatively simple and well-publicised rules on handheld phone use were better understood than more complex restrictions concerning other in-vehicle devices. Consequently, the meaning of a self-reported mobile-phone item may differ depending on whether a behaviour is prohibited, tolerated, hands-free, or integrated into the vehicle.

The mobile-phone component combines several forms of use. Their legality and risk are not identical across countries. Hands-free calling, handheld calling, reading messages, and interacting with social media involve different combinations of visual, manual, and cognitive distraction. A broad composite provides an overall indicator of engagement, but may obscure behaviour-specific relations. Future studies should separate the subtypes or model them jointly while allowing their predictors to differ.

Recent behaviour-specific evidence illustrates this heterogeneity. In an expanded TPB study distinguishing several forms of mobile phone use, PBC was the most important correlate of both intention and behaviour, while attitudes, moral norm, driving exposure, and intention also contributed depending on the outcome (Okati-Aliabad et al., 2024). This is closely aligned with the ESRA3 result in which PBC was almost as prominent as norms. It supports the interpretation that perceived capability to manage the device and traffic simultaneously is central, but also shows that the strength of the association depends on the precise activity being considered.

The systematic review of driving context by Cuentas-Hernandez et al. (2024) adds an important situational layer. Drivers appear less likely to engage in demanding phone tasks as traffic complexity increases, suggesting that use reflects an ongoing judgement about when the behaviour appears manageable. Such situational adaptation should not be equated with safety: a driver may postpone a task in a highly demanding situation yet still underestimate the risk of using the phone in familiar or apparently simple conditions. The ESRA3 PBC coefficient may therefore partly capture confidence in this self-selected timing strategy.

Phone use can also be maintained by broader patterns of maladaptive or compulsive use. A systematic review found that higher maladaptive mobile phone use was consistently associated with a greater likelihood of phone use on the road across drivers and other road users (Rahmillah et al., 2023). This extends the interpretation beyond a discrete traffic decision. For some respondents, the relevant mechanism may include fear of missing out, habitual checking, notification responsiveness, or difficulty disengaging from the device, none of which is directly measured by the present TPB-inspired indicators.

### Attitudes and intention

Attitudes were comparatively prominent for mobile phone use. This may reflect individual evaluations of convenience, necessity, productivity, responsiveness, and perceived risk. As with speeding, however, the broad attitudes component was not a dedicated multi-item scale for the behaviour. More precise measurement of instrumental and experiential attitudes could clarify which expected benefits sustain phone use.

The weak intention coefficient again likely reflects the single-item measure and temporal mismatch. Mobile phone use may also include habitual or cue-driven actions that are not fully represented by deliberate intention. A driver may unlock a phone or respond to a notification automatically, even while endorsing an intention not to use it. Future models should therefore consider habit, anticipated regret, moral norm, perceived susceptibility, and situational triggers alongside the TPB constructs. Extended TPB research demonstrates that such additional variables can improve explanation of risky road-user behaviour (Chorlton et al., 2012; Sumit et al., 2025).

The contrast between a weak intention coefficient and stronger PBC, norms, and attitudes is therefore substantively plausible rather than merely anomalous. Intention-based models work best when behaviour is planned, temporally aligned with the intention measure, and under conscious control. Phone interactions can instead be triggered within seconds by a notification, boredom, route familiarity, work expectations, or a perceived lull in traffic demand. The weak ESRA3 intention estimate may indicate that a general intention not to use the phone has limited protective value when routines and situational cues are not simultaneously addressed.

The same interpretation is supported by research on self-regulated compliance. Habitual mobile phone use was associated with a lack of regulation, while internal and external regulation were related to safer behaviour (Watson-Brown et al., 2024). Interventions should therefore not be limited to changing stated intention. They may need to support implementation routines, such as activating do-not-disturb functions, placing the device out of reach, clarifying workplace expectations, and arranging navigation or communication before starting the trip. These practical measures follow from the literature but were not tested by the present dissertation.

### Implications within a combined behavioural and systems approach

The national estimates can help prioritise the belief domains to address when developing formative interventions. Where social acceptability is strongly associated with use, normative mechanisms become a logical priority; where PBC is prominent, perceived capability to manage distraction warrants particular attention; and where attitudes have a comparatively large coefficient, the perceived benefits and costs of phone use become relevant targets for further investigation. These priorities should inform, rather than determine, the intervention mix. Mobile-phone distraction also requires consideration of legislation, enforcement, device and vehicle design, notification management, organisational expectations, and road design, all of which influence exposure and opportunity.

The literature on in-vehicle technology underscores this systems perspective. Rules that are complex or poorly understood can weaken compliance, while technological functions can simultaneously support and distract drivers (Jamson, 2013). Intervention development should therefore distinguish among handheld and hands-free activities, voluntary and work-related communication, and different traffic contexts. Country-specific priorities informed by the survey should be combined with evidence on observed phone-use

prevalence, the legal and technological context, and existing intervention effectiveness; the resulting strategy should then be evaluated against behavioural and safety outcomes.

The boundary between mobile-phone distraction and other forms of digital interaction is also becoming less distinct. A recent systematic review of automation and digitalisation found increased eyes-off-road behaviour in a substantial body of eye-tracking research and highlighted the limited ecological validity created by the predominance of simulator studies (Vijay et al., 2025). This development matters for TSC monitoring because drivers may regard an activity as acceptable when it is integrated into the vehicle even though it still imposes visual or cognitive demand. Future ESRA waves may need to distinguish portable-phone use from built-in touchscreens, voice interfaces, connected applications, and automation-related secondary tasks.

## 5.2 Cross-topic synthesis and implications for Traffic Safety Culture

### 5.2.1 A recurring pattern with behaviour-specific meanings

The three analyses reveal a recurring cross-topic pattern: norms had the largest pooled coefficient, attitudes and PBC made substantial but topic-dependent contributions, and intention had the smallest absolute coefficient. The consistency of the broad ordering is one of the central findings of the dissertation. At the same time, the meaning of each indicator is not identical across topics.

For speeding, norms appear to capture the normalisation of moderate or situational violations. For DUI, the same broad indicator may distinguish strong condemnation from residual tolerance. For mobile phone use, it may capture expectations of constant availability and perceived acceptance of short or supposedly manageable interactions. Likewise, PBC appears to represent different beliefs: confidence in controlling a speeding vehicle, confidence in driving despite impairment, and confidence in managing distraction. These differences caution against treating the coefficients as measurements of fixed psychological traits.

Recent meta-analytic evidence reinforces the need for this behaviour-specific reading. Across risky driving studies, attitudes often show the strongest relationship with intention and intention often shows the strongest relationship with prospective or observed behaviour, but the magnitude and ordering of the constructs vary by behaviour category and study design (Somoray et al., 2024; Hai et al., 2024). The ESRA3 pattern, characterised by prominent associations with broad acceptability indicators and comparatively small intention coefficients, should therefore be interpreted in light of its operationalisation: norms are measured broadly, behaviour and intention refer to different temporal directions, and the outcomes are composite self-reports. The result contributes a distinctive cross-national monitoring perspective rather than replacing the findings of dedicated TPB studies.

The literature added to the three topic sections also identifies a set of constructs that recur outside the original TPB: moral norm, descriptive norm, past behaviour, habit, self-regulation, risk perception, perceived legitimacy, and situational opportunity. Their recurrence suggests that unsafe driving is sustained by both reflective and automatic processes. Speeding may become routine, impaired driving may depend on rare but high-risk decision contexts, and phone use may be triggered by immediate cues. A common

four-domain framework is valuable for comparison, but the synthesis indicates where behaviour-specific extensions are most likely to improve explanation.

### 5.2.2 Why the dominance of norms should not be overgeneralised

The result strengthens the case for including normative indicators in international road-safety monitoring. It does not establish that norms are universally the most important causal determinant of unsafe driving. Four qualifications are central.

First, measurement breadth differs between the constructs. Norms combine personal and perceived social acceptability, while intention is represented by one item and attitudes are broad rather than topic-specific. A wider or more reliable indicator generally has more opportunity to correlate with a multi-item outcome. Part of the ordering may therefore be attributable to measurement design.

Second, all variables are self-reported in the same questionnaire. Shared method variance, common response styles, and consistency motives may strengthen associations between conceptually similar acceptability and behaviour items. The inclusion of social-desirability indicators reduces one source of bias but cannot remove all common-method effects.

Third, the models estimate direct associations. They do not represent the full causal sequence proposed by the TPB, in which attitudes, subjective norm, and PBC primarily influence intention and intention influences behaviour (Ajzen, 1991, 2020). Because the dissertation uses TPB-inspired composites rather than a validated TPB measurement model, the findings should be framed as evidence about a set of socio-cognitive indicators, not as a definitive test of the theory.

Fourth, the label "norms" covers conceptually different processes. The added literature shows that personal moral standards, perceived approval, perceived prevalence, peer-group practices, and broader beliefs about rule legitimacy can each be associated with unsafe driving (Rachad et al., 2024; Nicolls et al., 2022; Hultgren et al., 2024; Watson-Brown et al., 2024). A large coefficient for the ESRA3 component cannot determine which of these mechanisms is primary. This is not merely a terminological limitation: interventions that correct an exaggerated descriptive norm differ from interventions that strengthen moral obligation, increase perceived legitimacy, or challenge direct peer approval.

### 5.2.3 Cross-national heterogeneity: substantive signal and methodological caution

The national models show meaningful descriptive heterogeneity in coefficients and explanatory power. This supports the proposition that unsafe driving is embedded in national contexts and that a single pooled model cannot describe every country equally well. TSC offers a useful lens because it directs attention to shared beliefs and expectations alongside formal road-safety systems (Ward et al., 2019; Nævestad et al., 2026).

However, the observed heterogeneity cannot be attributed entirely to culture. Countries differ in legislation, enforcement, transport supply, infrastructure, vehicle fleets, economic conditions, exposure, and sampling. They also differ linguistically and in response styles. Harmonised administration is a necessary condition for comparison but not sufficient evidence that the constructs operate identically. Cross-national survey research

distinguishes form, metric, and scalar equivalence, and shows that equivalence must be tested rather than assumed (De Beuckelaer et al., 2007; De Beuckelaer & Lievens, 2009).

The country-specific PCA procedure adds another qualification. The same item sets were used, but the empirical scoring weights could differ by country. The national component scores are therefore analogous indicators rather than demonstrably invariant scales. Differences in regression coefficients may reflect both differences in relationships and differences in the measurement metric. This does not invalidate the national analyses, but it limits strong comparative statements such as declaring one country's normative effect definitively larger than another's.

The present dissertation consequently provides a descriptive map of cross-national patterns rather than a formal test of cultural moderation. Stronger tests would require common scoring coefficients or invariant latent measures, explicit country-by-predictor interactions, multigroup models, or a meta-analytic comparison of national estimates with their uncertainty.

The distinction between Traffic Culture, Traffic Safety Culture, and Traffic Safety Climate introduced in Section 1.2.2 helps locate these findings. The models describe individual socio-cognitive associations relevant to Traffic Safety Culture. Institutional and material aspects of Traffic Culture, and current perceptions of the traffic environment captured by Traffic Safety Climate, were not directly modelled. Reflective judgement, habitual responses, and reactions to immediate situational cues may also contribute differently across behaviours and settings. The national coefficient patterns cannot establish which of these unmeasured processes accounts for the observed differences. Their interpretation therefore requires additional contextual evidence.

The need for contextual caution is also visible in intervention research. A recent review of behaviour-change interventions for dangerous driving in low- and middle-income countries found substantial heterogeneity in intervention content and outcome measurement, limiting straightforward generalisation across settings (Fanai et al., 2025). This supports using coefficient patterns to prioritise candidate mechanisms rather than directly selecting a universal intervention. National differences can indicate which belief domains warrant greater attention during formative intervention development, while the form, delivery channel, enforcement environment, and feasibility of the response remain context-dependent.

### 5.2.4 Implications for TSC monitoring and intervention development

The findings support the inclusion of socio-cognitive indicators in road-safety monitoring because they add explanatory information that cannot be obtained from crash outcomes or roadside observations alone. They can reveal whether unsafe behaviour is associated primarily with acceptance, perceived capability, or another belief domain. This diagnostic value is especially relevant when the same questions are repeated across countries and survey waves.

This diagnostic value should nonetheless be interpreted in light of the current strength of the underlying evidence. As discussed in Section 1.2.3, cross-national evidence, including the analysis of 22 European countries by Meesmann et al. (2026), shows substantial alignment between several self-reported behaviours and independently observed behavioural indicators. The evidence linking TSC-related elements more directly to crashes, injuries, or fatalities is, however, less consistent and generally more indirect. Socio-

cognitive indicators are therefore best interpreted as diagnostic of behavioural patterns and their potential underlying mechanisms, rather than as validated proxies for road safety performance itself.

The practical use of these indicators should follow a staged process. National estimates can identify and prioritise candidate behavioural mechanisms by showing which socio-cognitive domains are most strongly associated with unsafe behaviour within a given model. These priorities should then be refined using behavioural theory and local evidence, including observed behaviour, exposure, enforcement data, crash records, qualitative research, stakeholder knowledge, and prior intervention evidence. Intervention components can subsequently be selected against clearly specified objectives and evaluated using appropriate outcome measures (Delhomme et al., 2009). A large regression coefficient therefore strengthens the empirical rationale for investigating a construct as a candidate intervention, but it is not itself an estimate of the behavioural effect or effectiveness of an intervention directed at that construct.

The broader definition developed by Nævestad et al. (2026) places TSC within the transport system and includes road users, organisations, authorities, and other actors. This perspective helps prevent an overly individualistic interpretation of the dissertation. The analyses focus on road users' reported beliefs and behaviour, but the beliefs themselves are shaped by formal rules, institutional practices, infrastructure, technology, and social interaction. TSC should therefore complement rather than replace the Safe System approach. Cultural interventions may help close the gap between formal policy and everyday enactment, while Safe System measures reduce the consequences of error and limit opportunities for unsafe behaviour.

Taken together, the recent literature suggests a layered use of TSC indicators. At the diagnostic level, surveys identify whether acceptance, perceived capability, intention, or other beliefs covary with behaviour. At the formative level, qualitative and behaviour-specific research determines what the broad indicator means locally. At the intervention level, communication is combined with enforcement, technology, infrastructure, organisational rules, and opportunity reduction. At the evaluation level, changes in beliefs are assessed alongside observed behaviour and safety outcomes. This sequence is more demanding than selecting the largest coefficient, but it is more consistent with both behaviour-change evidence and the Safe System conception of shared responsibility.

## 5.3 Methodological strengths and limitations

### 5.3.1 Strengths of the research design

The dissertation has several important strengths. First, it uses a large harmonised dataset covering 23,669 regular car drivers in 31 countries. The common questionnaire, coordinated fieldwork, central cleaning, and common analysis plan reduce many sources of procedural variation that normally complicate international comparison.

Second, the same analytical sample, covariates, and general modelling strategy were applied to three behaviours. This creates a controlled basis for cross-topic comparison that is rarely available when results are drawn from separate studies with different instruments and populations.

Third, the study reports both pooled and national models. The pooled analyses provide an overall summary, while the national analyses reveal where that summary conceals heterogeneity. Social-desirability indicators were included as covariates, and a GEE sen-

sitivity analysis examined average residual within-country correlation under an exchangeable working structure.

Fourth, the analytical choices are transparent. PCA was used for data reduction rather than presented as latent-factor validation, and the regression approach offers coefficients that are readily interpretable. These strengths make the dissertation a useful foundation for more advanced measurement and multilevel work.

### 5.3.2 Cross-sectional self-report data

All outcomes and socio-cognitive indicators are self-reported and measured at one time point. Self-report is essential for beliefs, intentions, and behaviours that are difficult to observe at scale, but it is vulnerable to recall error, misunderstanding, selection, careless responding, and socially desirable presentation (Choi & Pak, 2005; Krosnick & Presser, 2010; Van den Berghe & Meesmann, 2024). Research on mobility surveys likewise shows that reporting errors can vary systematically across respondents and behaviours (Cools et al., 2024).

The KSE-G indicators showed small but statistically significant associations with reported behaviour. The negative-quality score was oriented towards greater admission of faults, and its positive coefficients indicate that respondents admitting more negative qualities also reported more unsafe driving. These associations do not establish the extent to which adjustment removes reporting bias. The scale may not capture behaviour-specific misreporting, and cultural differences in self-presentation may remain. The central ESRA3 cleaning procedure removed respondents who failed quality checks, but increasing careless responding in commercial online panels remains a concern for future waves.

The cross-sectional design also prevents causal ordering. Beliefs may influence behaviour, behaviour may influence beliefs, or both may be shaped by unmeasured context. For example, repeated speeding may lead drivers to normalise the behaviour, while permissive norms may also make speeding more likely. Longitudinal and experimental designs are needed to distinguish these pathways.

The convergence between the ESRA3 findings and recent reviews increases confidence that the identified domains are substantively relevant, but it does not remove this causal limitation. Much of the behavioural literature synthesised in recent reviews also relies on cross-sectional self-report studies. Agreement across such studies can reflect a robust association while still leaving reciprocal causation, common-method variance, and omitted contextual factors unresolved.

### 5.3.3 Sample representativeness and country coverage

ESRA3 used quota sampling for gender and age and applied national weights, but online panels are not probability samples in which every eligible person has a known selection probability. Individuals with limited internet access, low panel participation, or low interest in surveys may be underrepresented. Weighting can correct observed differences in the variables used to construct the weights, but cannot remove selection bias related to unobserved characteristics.

The dissertation appropriately excluded countries with materially different data-collection modes, small samples of regular car drivers, or extreme weights. This improved comparability but reduced geographic coverage. The findings cannot be generalised to countries not included, to non-drivers, or to people who drive only occasionally. Africa, parts of

Latin America, and several regions of Asia remain underrepresented.

The urbanisation indicator also warrants caution. It is based on respondents' classification within the survey and may not correspond to administrative or population-density definitions used in international databases. Differences between survey and external urbanisation statistics do not necessarily indicate error, but they show that the indicator is not a fully standardised contextual measure. Its national coefficients should therefore be interpreted as adjusted associations within the ESRA coding rather than as estimates based on a common international urban-rural classification.

### 5.3.4 Construct operationalisation and measurement equivalence

The ESRA3 questionnaire was designed as a broad international monitoring instrument, not as a dedicated TPB scale. The study therefore assigned existing items to TPB-inspired domains. The resulting component scores should be described as composite indicators rather than validated latent constructs.

Several operational choices affect interpretation. Norms combine personal and perceived social acceptability. Attitudes are broad and include only limited topic-specific content. PBC primarily reflects perceived capability or confidence. Intention is represented by one future-oriented item, while behaviour refers to the past. The behavioural outcomes also combine sub-behaviours that may differ legally and psychologically. These compromises are understandable in a multi-purpose survey, but they limit claims about the complete TPB structure.

The expanded literature review indicates that these compromises matter differently by topic. Moral norm and past behaviour are particularly prominent in recent speeding syntheses; perceived sanction risk and prior offending are central to drink-driving deterrence research; and habit, maladaptive phone use, descriptive norms, and situational context recur in the distraction literature (Rachad et al., 2024; Love et al., 2024; Rahmillah et al., 2023; Cuentas-Hernandez et al., 2024). The present composite indicators may partially proxy these omitted constructs, which can increase explanatory power while making the substantive meaning of a coefficient less specific.

PCA was suitable for reducing correlated observed items to respondent-level scores, because the aim was not to establish a latent measurement model. It nevertheless uses total variance and does not separate common variance from item-specific or error variance. The explained variance and component loadings provide information about the empirical data reduction, not evidence that a theoretical construct has been validated. Future surveys designed around theory could use multiple behaviour-specific items, exploratory factor analysis or principal axis factoring to examine dimensionality, and confirmatory factor analysis to test the measurement model.

The supplementary comparison in Appendix G showed close correspondence between the saved pooled component scores and arithmetic means of the same items. Weighted correlations ranged from 0.9630 to approximately 1.0000, with the largest departures from equal weighting observed for mobile-phone norms and behaviour. This finding indicates that the two scoring methods capture closely related variation in respondents' answers. It does not establish construct validity, measurement invariance, or equivalence of the resulting regression estimates. The check concerns the pooled indicators; it does not resolve the additional comparability limitations introduced by country-specific scoring.

Cross-national comparison adds the requirement of measurement equivalence. Translated items can be administered identically yet interpreted differently. Formal tests of

configural, metric, and scalar invariance were not conducted, and country-specific component scoring permits different empirical weights. The national scores should thus be regarded as conceptually comparable but not demonstrably measurement-invariant. This qualification is particularly important when comparing coefficient magnitudes or country means.

### 5.3.5 Regression modelling and cross-country inference

Linear regression was a defensible choice because the outcomes were continuous PCA-derived scores and the purpose was to estimate adjusted linear associations using a common and transparent framework. The models do not, however, test the complete TPB, account for measurement error in the composites, or estimate indirect effects through intention.

The weighted GEE estimation produced exchangeable working-correlation estimates of 0.0230 for speeding, 0.0278 for DUI, and 0.0226 for mobile phone use. These small positive average residual correlations supports the practical decision to retain ordinary linear regression. Small correlations can nevertheless affect uncertainty estimates when clusters are large; their magnitude alone does not establish that ordinary-regression standard errors are adequate. The analysis also does not test equality of national intercepts or slopes or establish that country-level variables are irrelevant. The ordinary linear regressions are therefore interpreted as descriptive models, subject to these limitations.

The pooled models also combine respondents from all countries. Unless country indicators or a within-between decomposition are included, pooled coefficients can reflect both within-country and between-country variation. They should not automatically be interpreted as the average individual-level relationship within countries. A sensitivity analysis with country fixed effects would help determine whether the pooled socio-cognitive coefficients are robust to adjustment for stable national differences.

The national models involve many coefficients and significance tests. Differences in statistical significance can arise from sample size and precision rather than from different underlying associations. Formal comparison requires interactions, multigroup equality constraints, or comparison of estimates and confidence intervals within a common framework. The dissertation therefore correctly treats national contrasts as descriptive.

Model diagnostics should also accompany final reporting. Linearity, heteroscedasticity, influential observations, residual behaviour, and multicollinearity should be assessed and documented. Standardised component scores reduce some scaling problems but do not guarantee that these assumptions hold.

## 5.4 Priorities for future research

### 5.4.1 Develop behaviour-specific and cross-nationally comparable measures

The first priority is improved measurement. Future ESRA questionnaires could include multiple items for each behaviour-specific attitude, injunctive norm, descriptive norm, perceived control, intention, and relevant additional constructs. Moral norm, habit, anticipated regret, perceived risk, self-identity, fatalism, corruption beliefs, and behavioural beliefs are plausible extensions. The aim should not be to maximise questionnaire length, but to create sufficiently reliable measures for the key theoretical domains.

The literature reviewed in this chapter suggests a parsimonious priority set. For speeding, moral norm, past behaviour, and self-regulation deserve particular attention. For DUI, perceived sanction certainty, prior detection or punishment, substance-specific risk perception, and descriptive and injunctive peer norms should be separated. For mobile phone use, habit, maladaptive use, notification pressure, work-related expectations, task type, and situational driving demand should be considered. A modular questionnaire could retain a common cross-topic core while adding a limited number of behaviour-specific items.

Measurement development should proceed in stages: qualitative work to verify item meaning, pilot testing across languages, exploratory analysis, confirmatory factor analysis, and tests of measurement invariance. Common or partially invariant measures would provide a firmer basis for comparing means and structural relationships across countries. Where full scalar invariance is unrealistic, alignment methods or carefully specified partial invariance models may be considered.

### 5.4.2 Separate behaviours and align time frames

The second priority is greater behavioural specificity. Alcohol, illicit drugs, and medication should be examined separately where sample size permits. Mobile-phone activities should distinguish handheld calling, hands-free calling, messaging, social media, navigation, and integrated vehicle systems. Speeding should distinguish road types and inappropriate speed from legal-limit violations.

Greater specificity should also extend to the opportunity context. DUI items could identify the substance, approximate dose, time since use, trip purpose, and availability of an alternative driver or mode. Mobile-phone items could distinguish whether the vehicle was moving or stationary, whether the interaction was initiated by the driver or triggered by a notification, and whether it occurred through a portable or integrated interface. Speeding measures could distinguish deliberate speed choice from unintentional drift and could incorporate perceived credibility of the applicable limit.

Intention and behaviour should refer to aligned periods and levels of specificity. A prospective design could measure intention first and behaviour later. Repeated measurements would also help distinguish stable cultural patterns from short-term fluctuations and would reduce ambiguity about causal ordering.

### 5.4.3 Combine individual beliefs with system context

The third priority is a multilevel extension of TSC research. Individual survey data could be linked to country- or region-level indicators of legislation, enforcement, infrastructure, exposure, vehicle safety, transport alternatives, economic conditions, crash performance, and institutional practice. Exposure is particularly important because the opportunity to engage in a behaviour varies between individuals and countries (Van den Bossche et al., 2005; Hermans et al., 2008).

Multilevel models could separate individual-level associations from contextual effects and test whether national conditions modify socio-cognitive relationships. Structural equation models could be considered once measurement quality is adequate, while longitudinal multilevel models would provide a stronger basis for studying change. Such approaches would directly connect the informal cultural domain to the formal Safe System environment.

### 5.4.4 Evaluate interventions and examine meaningful groups

The fourth priority is to move from cross-sectional diagnosis to intervention evaluation. Campaigns, enforcement changes, technology deployment, or organisational policies can create quasi-experimental opportunities to test whether changes in beliefs precede changes in behaviour. Evaluation should include process measures, observed or administrative outcomes where possible, and checks for unintended effects.

Recent intervention reviews also show the need for greater consistency in outcome measurement and more rigorous evaluation designs (Fanai et al., 2025). For the three behaviours studied here, an intervention evaluation should ideally distinguish intermediate outcomes, such as knowledge, perceived norms, attitudes, and intention, from behavioural outcomes and crash-related indicators. This would allow researchers to determine whether an intervention changed the intended socio-cognitive mechanism and whether that change translated into safer behaviour.

Countries are useful comparative units because legislation, enforcement, and policy are often organised nationally. They are not necessarily homogeneous cultural groups. TSC may be more strongly shared within peer groups, organisations, workplaces, local communities, or road-user subcultures. The common definition proposed by Nævestad et al. (2026) explicitly refers to a meaningfully defined group of actors. Future research should therefore compare levels of aggregation and combine quantitative analysis with qualitative methods that can reveal how norms are produced, communicated, and contested.

## 5.5 Chapter summary

Across speeding, DUI, and mobile phone use while driving, the TPB-inspired socio-cognitive indicators were strongly associated with self-reported behaviour. Norms had the largest pooled coefficient for speeding and DUI, while norms and PBC had nearly identical pooled coefficients for mobile phone use. Intention had the smallest absolute pooled coefficient for each behaviour. The substantive interpretation differed across topics: speeding was associated with normative acceptance, DUI combined normative tolerance with perceived capability that may reflect overconfidence, and mobile phone use showed similarly prominent associations with acceptability and perceived capability.

The national models reveal substantial descriptive heterogeneity, supporting the relevance of context within TSC research. That heterogeneity should not be attributed exclusively to culture because measurement, sampling, response tendencies, exposure, and formal road-safety systems may also contribute. The findings are therefore most useful as a harmonised evidence base for prioritising candidate mechanisms and guiding further local investigation, measurement development, intervention design, and evaluation.

The expanded literature review strengthens this diagnostic interpretation. Recent syntheses support the relevance of the TPB domains, but repeatedly identify additional roles for moral and descriptive norms, past behaviour, habit, self-regulation, deterrence, risk perception, maladaptive phone use, and situational context. The principal contribution of the dissertation is therefore not a claim that one universal psychological model has been confirmed. It is the demonstration that a harmonised set of socio-cognitive indicators reveals both a recurring cross-topic pattern and substantial contextual variation across 31 countries, thereby providing a structured basis for more specific theory testing and locally grounded intervention research.

# Chapter 6

# Conclusion

This dissertation examined cross-national variation in the adjusted associations between self-reported unsafe driving behaviour and a common set of socio-cognitive indicators. Traffic Safety Culture (TSC) was operationally approached at the country level, following the emphasis of Ward et al. (2019) on shared beliefs that are relevant to traffic-safety behaviour. At the same time, the dissertation recognised that TSC is broader than any single set of survey indicators and may concern road users, organisations, authorities, and other meaningfully defined groups within the transport system (Nævestad et al., 2026).

The empirical analyses used data from 23,669 regular car drivers in 31 countries participating in ESRA3. A Theory of Planned Behaviour (TPB)-inspired framework (Ajzen, 1991) was applied to three behaviours: speeding, driving under the influence (DUI) of alcohol, drugs or medication, and mobile phone use while driving. For each topic, one pooled cross-national linear regression model and 31 national models were estimated. The models related self-reported behaviour to attitudes, norms, perceived behavioural control (PBC), intention, social desirability, socio-demographic characteristics, and driving frequency. The purpose was not to validate a complete latent TPB model or to establish causal effects. Rather, the dissertation used a consistent analytical framework to identify recurring and country-specific patterns in the associations between TPB-inspired indicators and unsafe driving.

## 6.1 Answers to the research questions

The first research question concerned the extent to which the TPB-inspired indicators were associated with the three self-reported behaviours in pooled models covering all 31 countries. The analyses showed that attitudes, norms, PBC, and intention were associated with each topic after adjustment for the remaining variables. The pooled models had an $R^2$ of 0.58 for speeding, 0.50 for DUI, and 0.52 for mobile phone use while driving. These values indicate that the complete model specifications accounted for a substantial proportion of variation in the composite behavioural scores. They should not, however, be attributed solely to the four socio-cognitive indicators because the models also included socio-demographic, exposure-related, and social-desirability variables.

In the pooled models, norms had the largest estimated standardised coefficient for speeding and DUI, while norms and PBC had nearly identical coefficients for mobile phone use. Attitudes and PBC also showed substantial positive associations, but their relative prominence differed by topic. PBC was comparatively less prominent in the speeding model and more prominent in the DUI and mobile-phone models. Intention

had the smallest absolute coefficient in all three pooled models. Its negative associations with unsafe behaviour were consistent with the intention items referring to future safe conduct. The weak intention coefficients should be interpreted in light of the single-item operationalisation and the temporal mismatch between intention for the next 30 days and behaviour during the previous 30 days.

The second research question concerned whether these adjusted associations were also observed within the 31 national samples. The national analyses showed a broadly recurring pattern, but not an identical one. Norms had the largest coefficient in every national speeding model and in most national DUI and mobile-phone models. Attitudes and PBC were statistically significant in many, but not all, countries, while intention showed the least consistent national association. The national model fit also varied considerably. Across all topics, $R^2$ ranged from 0.26 for DUI in Greece to 0.70 for speeding in the United States. The common analytical framework therefore had explanatory value in every national context, but it described some country-topic combinations more closely than others.

The third research question concerned descriptive variation in national coefficients and model fit. The results revealed considerable heterogeneity. For example, the norms coefficient for speeding ranged from 0.300 in Greece to 0.581 in France, while the corresponding coefficient for DUI ranged from 0.182 in Serbia to 0.614 in Sweden. In Bosnia and Herzegovina, Israel, Poland, and Serbia, PBC rather than norms had the largest coefficient in the DUI model. These contrasts show that the relative prominence of the socio-cognitive indicators was not uniform across countries.

This heterogeneity is relevant to TSC because it is consistent with the proposition that behaviour is embedded in different social and institutional contexts. It nevertheless remains a descriptive result. The national coefficients were estimated in separate models, and numerical differences were not tested through equality constraints, country-by-predictor interactions, or a multigroup model. Moreover, the country-specific principal component analyses used the same item sets but could assign different empirical weights to those items. The findings therefore provide a comparative map of national patterns rather than definitive evidence that one country has a statistically larger cultural effect than another.

The fourth research question concerned common and topic-specific patterns. The common pattern was the prominence of norms, followed by substantial but behaviour-dependent roles for attitudes and PBC and a comparatively weak role for intention. The topic-specific interpretation is equally important. For speeding, norms primarily appear to capture the normalisation and perceived acceptability of speed-limit violations. For DUI, they distinguish strong condemnation from residual tolerance, while PBC may partly represent confidence in driving despite impairment. For mobile phone use, norms may reflect expectations of availability and the normalisation of digital interaction, whereas PBC may capture confidence in managing distraction. Thus, similarly labelled indicators do not necessarily represent identical psychological processes across behaviours.

## 6.2 Scientific contribution

The dissertation makes four principal contributions. First, it provides a harmonised comparison of three major unsafe driving behaviours using the same international survey, analytical sample, construct framework, covariate set, and modelling strategy. This creates a stronger basis for cross-topic comparison than would be possible by synthesising

studies that use different questionnaires, populations, and model specifications.

Second, the dissertation contributes to TSC research by examining variation in adjusted associations rather than restricting comparison to country means or behaviour prevalence. The broad pattern was recurrent across countries, yet the magnitude and relative ordering of the indicators varied. This combination of recurrence and heterogeneity suggests that international TSC research needs both a common comparative framework and careful attention to context.

Third, the dissertation contributes methodologically by transparently applying principal component analysis as a data-reduction technique to existing ESRA3 variables and by using the resulting respondent-level component scores in a common regression framework. The indicators should be understood as TPB-inspired composites rather than validated latent variables. This distinction is important because the ESRA3 questionnaire was designed as a broad international monitoring instrument, not as a dedicated psychometric TPB scale.

Fourth, the study demonstrates the practical value of incorporating socio-cognitive indicators into road-safety monitoring. Crash outcomes and observed behaviour remain indispensable, but they cannot directly reveal whether an unsafe practice is associated with permissive attitudes, perceived acceptability, confidence in managing risk, or weak motivation to comply. Survey indicators add an explanatory layer and can help prioritise candidate socio-cognitive targets for the development of formative interventions. Their policy value therefore lies in focusing subsequent investigation and target selection, which should then be complemented by observed behaviour, enforcement data, exposure measures, crash records, qualitative knowledge, and prior intervention evidence.

## 6.3 Implications for Traffic Safety Culture and road-safety policy

The findings support the use of TSC as a complementary perspective within a Safe System approach. Formal road-safety measures operate through legislation, enforcement, infrastructure, vehicle technology, transport alternatives, and institutional practice. Their effectiveness also depends on how road users and other actors understand, accept, and enact safety. The prominence of normative indicators across the three topics illustrates that unsafe driving is not merely an isolated individual choice; it is connected to beliefs about what is personally acceptable and what is perceived to be accepted by others.

The prominence of normative indicators provides an empirical basis for prioritising normative mechanisms in formative intervention development. It does not imply that normative communication should automatically be the preferred intervention in every setting, because a regression coefficient identifies an adjusted association rather than a proven causal mechanism or intervention effect. The broad ESRA3 norms component also combines personal and perceived social acceptability, which may reflect several distinct processes. Correcting an inaccurate descriptive norm, strengthening moral disapproval, increasing perceived legitimacy, and challenging direct peer approval would require different interventions.

The national models therefore provide evidence-informed decision support for the formative and prioritisation stages of intervention development. Where norms are especially prominent, they provide a rationale for examining normative mechanisms such as perceived prevalence and acceptance; where PBC is more prominent, they direct attention

towards mechanisms such as overconfidence, perceived ease, habit, or limited awareness of impairment and distraction. These empirically prioritised targets should then be combined with behavioural theory, local contextual evidence, and established intervention knowledge when campaigns or other measures are designed, implemented, and evaluated against clearly specified behavioural mechanisms and outcomes (Delhomme et al., 2009).

Country is also an analytically useful but imperfect representation of culture. National legislation, enforcement, and policy create common contextual conditions, but beliefs are not necessarily homogeneous within national borders. TSC may be shared more strongly within peer groups, workplaces, organisations, local communities, or road-user subcultures. The dissertation's national comparisons should therefore be interpreted as evidence of systematic contextual variation, not as fixed characterisations of entire populations.

## 6.4 Methodological boundary conditions

Several boundary conditions define what can and cannot be concluded from the study. The cross-sectional design does not establish temporal or causal direction. Drivers may act in accordance with permissive beliefs, but repeated behaviour may also shape later attitudes and norms through experience and rationalisation. The exclusive use of self-reported measures introduces possible recall error, common-method variance, social-desirability bias, and cross-cultural differences in response style and interpretation. Including social-desirability indicators addresses one source of bias but cannot remove all measurement error.

The analytical sample consisted of regular car drivers aged 18–74 in 31 countries. The findings cannot be generalised without qualification to occasional drivers, non-drivers, other road-user groups, or countries not included in the analysis. Geographic coverage was also uneven, particularly for Africa and parts of Asia and Latin America.

The harmonised ESRA3 questionnaire and fieldwork design support international comparison, but harmonisation does not by itself establish measurement invariance. The same labels and item sets may not have identical meanings or psychometric properties across languages and national contexts. Country-specific PCA scoring further means that national component scores are analogous rather than demonstrably identical scales. Strong claims about cross-country coefficient rankings should therefore be avoided until the measurement structure and coefficient differences have been tested formally.

The supplementary comparison in Appendix G showed close correspondence between pooled component scores and arithmetic mean item scores, with weighted correlations from 0.9630 to approximately 1.0000. This supports a limited conclusion about the similarity of the resulting composite indicators.

Linear regression provided transparent estimates of adjusted associations with continuous PCA-derived scores. It did not model measurement error, indirect pathways through intention, or a complete causal TPB structure. The weighted GEE estimation produced small positive exchangeable working correlations, ranging from approximately 0.023 to 0.028, supporting the practical use of ordinary linear regression for the pooled individual-level analysis under the tested structure. This result does not imply that country context is irrelevant or that all regression assumptions are automatically satisfied. The national models themselves demonstrate meaningful contextual heterogeneity.

## 6.5 Directions for future research

Future research should first strengthen behaviour-specific measurement. Multiple items are needed for attitudes, injunctive norms, descriptive norms, PBC, and intention for each behaviour. Additional constructs such as moral norm, habit, anticipated regret, perceived risk, sanction certainty, self-regulation, fatalistic beliefs, and perceived legitimacy could be included selectively where theory and qualitative research support them. The measurement period and level of specificity of intention and behaviour should also be aligned.

Second, cross-national comparability should be tested more directly. Future studies could begin with qualitative and cognitive testing across languages, followed by exploratory and confirmatory analyses and formal tests of measurement invariance. Common pooled scoring coefficients, partial-invariance models, or other explicitly comparable scoring strategies would provide a stronger basis for comparing country means and regression relationships.

Third, individual survey data should be linked to contextual information on legislation, enforcement, infrastructure, vehicle fleets, exposure, public transport alternatives, economic conditions, and road-safety performance. Multilevel models could then separate individual-level associations from national or regional contextual effects and examine whether formal Safe System conditions modify socio-cognitive relationships.

Fourth, longitudinal, experimental, and quasi-experimental studies are needed to investigate temporal ordering and intervention mechanisms. Repeated ESRA measurements can identify changes in indicators, but causal interpretation requires designs that establish whether changes in beliefs precede changes in behaviour. Evaluations should distinguish intermediate socio-cognitive outcomes from observed behaviour and crash-related outcomes.

Finally, future work should examine TSC among other road-user groups and at levels other than the country. Pedestrians, cyclists, motorcyclists, professional drivers, and users of emerging mobility technologies may be influenced by different norms and opportunity structures. Studies of peer groups, organisations, workplaces, and local communities could clarify what constitutes a meaningfully shared safety culture and how beliefs are created, transmitted, and changed.

## 6.6 Closing remark

The central contribution of this dissertation lies in demonstrating two findings simultaneously. A common set of TPB-inspired socio-cognitive indicators produced recurring associations across 31 countries: norms were especially prominent for speeding and DUI, while norms and PBC were similarly prominent for mobile phone use. At the same time, the relative magnitude of the coefficients and the explanatory power of the models varied substantially across countries and behaviours.

This combination of consistency and heterogeneity is more informative than either finding alone. It shows that a harmonised international framework can reveal common behavioural patterns without implying that unsafe driving has the same meaning or determinants everywhere. TSC should therefore not be reduced to a single universal hierarchy of predictors or to a fixed national label. It is better understood as a context-dependent configuration of beliefs, practices, and formal system conditions.

The ESRA3 analyses provide a comparative evidence base for this broader research programme. They identify where beliefs about acceptability, perceived capability, and intention are most strongly associated with unsafe driving and can therefore help prioritise the socio-cognitive mechanisms that warrant further investigation within particular country-topic contexts. This is a meaningful contribution to the development of formative interventions, even though the coefficients themselves are not estimates of intervention effects. By combining these empirically informed priorities with stronger measurement, contextual data, prior intervention evidence, and longitudinal or intervention-based research, future studies can develop a more complete account of how TSC is related to behaviour and how cultural and system-level change can contribute to safer road transport.

# Declaration of Competing Interests

The author declares that there are no competing financial or non-financial interests that could have influenced the research presented in this dissertation.

# Declaration of Generative AI and AI-assisted Technologies

During the preparation and revision of this dissertation, the author used Claude (Sonnet 5, Anthropic) and ChatGPT (GPT-5.6 Thainking, OpenAI) to assist with language editing, including improvements to grammar, clarity, and concision, and the restructuring and consistency checking of text. The author reviewed, edited, and approved all AI-assisted and takes full responsibility for the accuracy, integrity, interpretation, and conclusions of the dissertation.

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# Appendix A

# ESRA3 questionnaire

This appendix reproduces the English ESRA3 master questionnaire. Country placeholders and documented national adaptations are retained in square brackets or footnotes. The questionnaire is reproduced for transparency; the variables used in the dissertation analyses are identified in Appendices B–D.

## Introduction

In this questionnaire, we ask you some questions about your experience with, and your attitudes towards traffic and road safety. When responding to a question, please answer in relation to the traffic and road safety situation in [COUNTRY]. There are no right or wrong answers; what matters is your own experience and perception.

## Socio-demographic information

**Q1) In which country do you live?** _____

**Q2) Are you ...** male - female - other

**Q3) How old are you (in years)?** [Drop down menu]

**Q4_1) Are you currently a student?** yes - no

**Q4_2) What is the highest qualification or educational certificate which you want to achieve?** primary education - secondary education - bachelor's degree or similar - master's degree or higher

**Q4_3) What is the highest qualification or educational certificate that you have obtained?** none - primary education - secondary education - bachelor's degree or similar - master's degree or higher

**Q5) Which of the descriptions comes closest to how you feel about your household's income nowadays?** living comfortably on present income - coping on present income - finding it difficult on present income - finding it very difficult on present income

**Q6a) Is the car you regularly drive equipped with seatbelts in the front seat?** yes - no
Only asked to LMIC[1] countries.

**Q6b) Is the car you regularly drive equipped with seatbelts in the back seat?** yes - no
Only asked to LMIC countries.

**Q7) Are you using a carsharing organisation (e.g., poppy or cambio[2])?** yes - no
Only asked to HIC[3]/UMIC[4] countries.

**Q8) Do you have to drive or ride a vehicle during your main professional activity?** yes, I transport mainly other person(s) (e.g., taxi, bus, rickshaw, ...) - yes, I transport mainly goods (e.g., truck, courier, food delivery,...) - yes, I transport mainly myself (e.g., visiting patients, salesperson,...) - no, I drive or ride a vehicle only for commuting or private reasons

**Q9) Which phrase best describes the area where you live?** a farm or home in the countryside - a country village - a town or a small city - the suburbs or outskirts of a big city - a big city

**Q10) In which region do you live?** [List of regions per country]

**Q11a) How far do you live from the nearest stop of public transport?** less than 500 metres - between 500 metres and 1 kilometre - more than 1 kilometre

**Q11b) What is the frequency of your nearest public transport?** at least 3 times per hour - 1 or 2 times per hour - less than 1 time per hour

## Mobility & exposure

**Q12) During the past 12 months, how often did you use each of the following transport modes in [country]? How often did you ...?**
at least 4 days a week - 1 to 3 days a week - a few days a month - a few days a year - never
Items (random order): take the train - take the bus or minibus - take the tram/streetcar - take the subway, underground, metro - take a plane - take a ship/boat or ferry - be a passenger on non-motorized individual public transport mode (e.g., bike taxi, animal carriages,...) - be a passenger on motorized individual public transport mode (e.g., car-taxi, moto-taxi, tuk-tuk, auto rickshaw, songthaew,... ) - walk or run minimum 200m down the street - cycle (non-electric) - cycle on an electric bicycle / e-bike / pedelec - drive a moped ($\leq$ 50 cc or $\leq$ 4 kW) - drive a motorcycle ($>$ 50 cc or $>$ 4kW) - ride an e-scooter (electric-kick style scooter) - drive a car (non-electric or non-hybrid) - drive a

[1]Lower-Middle Income Countries (World Bank classification 2023)
[2]The examples in brackets were adapted to national context.
[3]High Income Countries (World Bank classification 2023)
[4]Upper-Middle Income Countries (World Bank classification 2023)

hybrid or electric car - be a passenger in a car - be a passenger on a moped or motorcycle - use another transport mode

**Q13) Over the last 30 days, have you transported a child (<18 years of age) in a car?** yes - no
Items (random order): under 150cm - above 150cm[5]

## Self-declared safe and unsafe behaviour in traffic

**Q14_1a) Over the last 30 days, how often did you as a CAR DRIVER . . . ?**
You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: at least once (2-5) - never (1); only exception: items on protective systems: always wear/transport (1) - not always wear/transport (2-5)
Items (random order):

- drive when you may have been over the legal limit for drinking and driving
- drive after drinking alcohol
- drive within 1 hour after taking drugs (other than prescribed or over the counter medication)
- drive within 2 hours after taking medication that may affect your driving ability
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (except motorways/freeways)
- drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)
- drive faster than the speed limit on motorways/freeways
- drive without wearing your seatbelt
- transport children under 150cm[6] without using child restraint systems (e.g., child safety seat, cushion)
- transport children above 150cm[7] without wearing their seat belt
- talk on a hand-held mobile phone while driving
- talk on a hands-free mobile phone while driving
- read a message or check social media/news while driving
- drive when you were so sleepy that you had trouble keeping your eyes open

**Q14_1b_1) You said that you have driven a car when you may have been over the legal limit for drinking and driving. Was this . . . ?** You can indicate multiple answers: in the week during daytime - in the week during night-time - in the weekend during daytime - in the weekend during night-time - on motorways - on urban roads - on rural roads
Only asked to HIC/UMIC countries.

**Q14_1b_2) You said that you have driven a car within 1 hour after taking drugs (other than prescribed or over the counter medication). Was this . . . ?**
You can indicate multiple answers: cannabis - cocaine - amphetamines (e.g., speed, extasy)

[5]This question was adapted to national legal regulation.
[6]This question was adapted to national legal regulation.
[7]This question was adapted to national legal regulation.

- illicit opiates (e.g., morphine, codeine; not prescribed as medication) - other

**Q14_1b_3) You said that you have driven a car within 2 hours after taking medication that may affect your driving ability. Was this . . . ?** You can indicate multiple answers[8]**:** antihistamines and/or cough medicines (such as Claritin, Allegra, Benadryl) - antidepressants (such as Prozac, Zoloft, Wellbutrin) - prescription pain medicines (such as Tylenol with codeine, OxyContin, Percocet, Vicodin/ hydrocodone) - muscle relaxants (such as Soma, Flexeril) - sleep aids, Barbiturates, or Benzodiazapines (such as Ambien, Lunesta, phenobarbital, Xanax, Valium, Ativan) - amphetamines (such as Adderall, Dexedrine, phentermine) - other

**Q14_2) Over the last 30 days, how often did you as a CAR PASSENGER . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: always wear/transport (1) - not always wear/transport (2-5)
Items (random order):
- travel without wearing your seatbelt in the back seat
- travel without wearing your seatbelt in the front seat

**Q14_3) Over the last 30 days, how often did you as a MOPED RIDER or MOTORCYCLIST . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: at least once (2-5) - never (1); only exception: items on protective systems: always wear/transport (1) - not always wear/transport (2-5)
Items (random order):
- ride when you may have been over the legal limit for drinking and driving
- ride faster than the speed limit outside built-up areas (except motorways/freeways)
- not wear a helmet on a moped or motorcycle
- read a message or check social media/news while riding
- ride within 1 hour after taking drugs (other than prescribed or over the counter medication)
- ride too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users) - Only asked to LMIC countries.
- ride a motorcycle with more than 1 passenger

**Q14_4) Over the last 30 days, how often did you as a CYCLIST . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: at least once (2-5) - never (1); only exception: items on protective systems: always wear/transport (1) - not always wear/transport (2-5)
Items (random order):
- cycle when you think you may have had too much to drink
- cycle without a helmet
- cycle while listening to music through headphones
- read a message or check social media/news while cycling

[8]The examples in brackets were adapted to national context.

- cycle within 1 hour after taking drugs (other than prescribed or over the counter medication)
- cross the road when a traffic light is red

**Q14_5) Over the last 30 days, how often did you as a PEDESTRIAN ...?** You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: at least once (2-5) - never (1); only exception: items on protective systems: always wear/transport (1) - not always wear/transport (2-5)
Items (random order):

- listen to music through headphones while walking down the street
- walk down the street when you think you may have had too much to drink
- read a message or check social media/news while walking down the street
- text a message while walking down the street
- cross the road when a pedestrian light is red
- cross the road at places other than at a nearby (distance less than 30m[9]) pedestrian crossing

**Q14_6) Over the last 30 days, how often did you as RIDER OF AN E-SCOOTER (electric-kick style scooter) ...?** You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for most items: at least once (2-5) - never (1); only exception: items on protective systems: always wear/transport (1) - not always wear/transport (2-5)
Only asked to HIC/UMIC countries.
Items (random order):

- ride with more than 1 person on board
- ride when you think you may have had too much to drink
- cross the road when a traffic light is red
- ride on pedestrian pavement/sidewalk
- ride without a helmet

## Acceptability of safe and unsafe traffic behaviour

**Q15) Where you live, how acceptable would most other people say it is for a CAR DRIVER to ....?** You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) - unacceptable/neutral (1-3)
Items (random order):

- drive when he/she may be over the legal limit for drinking and driving
- drive faster than the speed limit outside built-up areas (except motorways/freeways)
- drive without wearing the seatbelt
- talk on a hand-held mobile phone while driving
- read a message or check social media/news while driving

[9]This question was adapted to national legal regulation.

**Q16_1) How acceptable do you, personally, feel it is for a CAR DRIVER to . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) - unacceptable/neutral (1-3)
Items (random order; instructed response item (trick item) as last item):

- drive when he/she may be over the legal limit for drinking and driving
- drive within 1 hour after taking drugs (other than prescribed or over the counter medication)
- drive within 2 hours after taking a medication that may affect the driving ability
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (except motorways/freeways)
- drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)
- drive faster than the speed limit on motorways/freeways
- drive without wearing the seatbelt
- transport children in the car without securing them (child's car seat, seatbelt, etc.)
- talk on a hand-held mobile phone while driving
- talk on a hands-free mobile phone while driving
- read a message or check social media/news while driving
- drive when he/she is so sleepy that he/she has trouble keeping their eyes open
- Please, select the answer option number 5 "acceptable". (Instructed response item (trick item))

**Q16_2) How acceptable do you, personally, feel it is for a MOPED RIDER or MOTORCYCLIST to . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) - unacceptable/neutral (1-3)
Items (random order):

- ride when he/she may have been over the legal limit for drinking and driving
- ride faster than the speed limit outside built-up areas (except motorways/freeways)
- not wear a helmet on a moped or motorcycle
- read a message or check social media/news while riding
- ride a motorcycle with more than 1 passenger - Only asked to LMIC countries.

**Q16_3) How acceptable do you, personally, feel it is for a CYCLIST to . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) - unacceptable/neutral (1-3)
Items (random order):

- cycle when he/she may have had too much to drink
- cycle without a helmet
- read a message or check social media/news while cycling
- cross the road when a traffic light is red

**Q16_4) How acceptable do you, personally, feel it is for a PEDESTRIAN to . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.

Binary variable: acceptable (4-5) - unacceptable/neutral (1-3)
Items (random order):
- walk down the street when he/she may have had too much to drink
- read a message or check social media/news while walking down the street
- cross the road when a pedestrian light is red

## Attitudes towards safe and unsafe behaviour in traffic

**Q17) To what extent do you agree with each of the following statements?** You can indicate your answer on a scale from 1 to 5, where 1 is "disagree" and 5 is "agree". The numbers in between can be used to refine your response.
Binary variable: agree (4-5) - disagree/neutral (1-3)
Items (random order):
*Behaviour believes & attitudes*
- For short trips, one can risk driving under the influence of alcohol.
- I have to drive fast; otherwise, I have the impression of losing time.
- Respecting speed limits is boring or dull.
- Motorized vehicles should always give way to pedestrians or cyclists.
- I use a mobile phone while driving, because I always want to be available.
- To save time, I often use a mobile phone while driving.

*Perceived behaviour control (self-efficacy)*
- I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer).
- I have the ability to drive when I am a little drunk after a party.
- I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine).
- I trust myself when I drive significantly faster than the speed limit.
- I have the ability to drive significantly faster than the speed limit.
- I am able to drive fast through a sharp curve.
- I trust myself when I check messages on the mobile phone while driving.
- I have the ability to write a message on the mobile phone while driving.
- I am able to talk on a hand-held mobile phone while driving.

*Habits*
- I often drive after drinking alcohol.
- I often drive faster than the speed limit.
- I often use my mobile phone while driving.

*Intention*
- I intend not to drive after drinking alcohol in the next 30 days.
- I intend to respect speed limits in the next 30 days.
- I intend not to use my mobile phone while driving in the next 30 days.

## Subjective safety & risk perception

**Q18) How safe or unsafe do you feel when using the following transport modes in [country]?** You can indicate your answer on a scale from 0 to 10, where 0 is "very unsafe" and 10 is "very safe". The numbers in between can be used to refine your response.
Items (random) = Items indicated by the respondent in Q12 are displayed.

**Q19) How often do you think each of the following factors is the cause of a road crash involving a car**? You can indicate your answer on a scale from 1 to 6, where 1 is "never" and 6 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable: often/frequently (4-6) - not that often/not frequently (1-3)
Items (random order):
- driving after drinking alcohol
- driving within 1 hour after taking drugs (other than prescribed or over the counter medication)
- driving faster than the speed limit
- using a hand-held mobile phone while driving
- using a hands-free mobile phone while driving
- inattentiveness or daydreaming while driving
- driving while tired

## Support for policy measures

**Q20) Do you oppose or support a legal obligation . . . ?** You can indicate your answer on a scale from 1 to 5, where 1 is "oppose" and 5 is "support". The numbers in between can be used to refine your response.
Binary variable: support (4-5) - oppose/neutral (1-3)
Items for all countries (random order):
- forbidding all drivers of motorized vehicles to drive with a blood alcohol concentration above 0.0 ‰ (zero tolerance)
- forbidding all drivers of motorized vehicles to use a hand-held mobile phone while driving
- limiting the speed limit to 30 km/h in all built-up areas (except on main thoroughfares)
- requiring all cyclists to wear a helmet
- limiting the speed limit to a maximum of 80 km/h on all rural roads without a median strip
- forbidding all novice drivers of motorized vehicles (licence obtained less than 2 years ago) to drive with a blood alcohol concentration above 0.0 ‰ (zero tolerance)

Items only for HIC/UMIC countries (random order):
- installing 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 a certain limit)
- requiring cyclists under the age of 12 to wear a helmet
- forbidding all cyclists to ride with a blood alcohol concentration above 0,0‰ (zero tolerance)

Items only for LMIC countries (random order):
- forbidding all professional drivers of motorized vehicles (e.g., taxis, vans, trucks, buses, . . . ) to drive with a blood alcohol concentration above 0.0 ‰ (zero tolerance)
- requiring all moped and motorcycle riders and passengers to wear a helmet
- requiring all car drivers and passengers (front- and back seat) to wear a seatbelt
- making liability insurance mandatory for owners of cars

**Q21) Please think of the policy measure: "..." and indicate if you agree or**

**disagree with the following statements about it. This policy measure would ...?** Disagree - agree

Random selection of one of the first 4 items in Q20 per respondent. All first 4 items in Q20 are be asked equally often in each country.

Items (random order):

- reduce the number of road crashes and injuries
- increase the safety feeling on the streets
- have negative side effects
- restrict people's individual freedom
- reduce the privacy of people
- limit people's mobility
- lead to discrimination
- be fair
- be expensive for people
- be easy to implement
- be difficult to enforce by the police
- be a burden for people
- be an unjustifiable intervention by the state
- be supported by many of my friends

# Enforcement

**Q22) On a typical journey, how likely is it that you (as a car driver) will be checked by the police (including cameras or radars) for ...?** You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.

Binary variable: likely (5-7) - unlikely/neutral (1-4)

Items (random order):

- alcohol, in other words, being subjected to a Breathalyser test
- the use of illegal drugs
- respecting the speed limits
- wearing your seatbelt
- the use of hand-held mobile phone to talk or text while driving

**Q23_1) In the past 12 months, how many times have you been checked by the police for using alcohol while driving a car (i.e., being subjected to a Breathalyser test)?** Never - 1 time - at least 2 times - Binary variable: at least once - never

**Q23_2) In the past 12 months, how many times have you been checked by the police for using drugs (other than prescribed or over the counter medication) while driving a car?** Never - 1 time - at least 2 times - Binary variable: at least once - never

# Involvement in road crashes

The following questions focus on road crashes. With road crashes, we mean any collision involving at least one road vehicle (e.g., car, motorcycle, or bicycle) in motion on a public or private road to which the public has right of access. Furthermore, these crashes result in material damage, injury, or death. Collisions include those between road vehicles, road vehicles and pedestrians, road vehicles and animals or fixed obstacles, road and rail vehicles, and one road vehicle alone.

**Q24a) In the past 12 months, have you personally been involved in a road crash where at least one person was injured (light, severe or fatal crashes)?** Yes - no

**Q24b) Please indicate the transport mode(s) YOU were using at the time of these crashes. You can indicate multiple answers:** as a car driver - as a car passenger - as a moped or motorcycle rider - as a moped or motorcycle passenger - as a cyclist - as a pedestrian - as a rider of an e-scooter (electric-kick style scooter) - other

# Infrastructure

**Q25_1_a) As a CAR DRIVER, what type of roads do you regularly use in [country]?** You can indicate multiple answers: inter-city motorways - thoroughfares and high-speed roads within cities - rural roads and roads connecting towns and villages - other streets and roads in urban areas

**Q25_1_b) As a CAR DRIVER, how would you rate the roads that you regularly use in terms of safety?** You can indicate your answer on a scale from 1 to 7, where 1 is "very unsafe" and 7 is "very safe". The numbers in between can be used to refine your response.
Binary variable: safe (5-7) - unsafe/neutral (1-4)
Items (random order):
- inter-city motorways
- thoroughfares and high-speed roads within cities
- rural roads and roads connecting towns and villages
- other streets and roads in urban areas

**Q25_2_a) As a MOPED RIDER or MOTORCYCLIST, what type of roads do you regularly use in [country]?** You can indicate multiple answers: thoroughfares and high-speed roads within cities - rural roads and roads connecting towns and villages - other streets and roads in urban areas

**Q25_2_b) As a MOPED RIDER or MOTORCYCLIST, how would you rate the roads that you regularly use in terms of safety?** You can indicate your answer on a scale from 1 to 7, where 1 is "very unsafe" and 7 is "very safe". The numbers in between can be used to refine your response.
Binary variable: safe (5-7) - unsafe/neutral (1-4)
Items (random order):

- thoroughfares and high-speed roads within cities
- rural roads and roads connecting towns and villages
- other streets and roads in urban areas

**Q25_3_a) As a CYCLIST, what type of roads/cycle lanes do you regularly use in [country]?** You can indicate multiple answers: rural roads and roads connecting towns and villages with cycle lanes - rural roads and roads connecting towns and villages without cycle lanes - streets and roads in urban areas with cycle lanes - streets and roads in urban areas without cycle lanes

**Q25_3_b) As a CYCLIST, how would you rate the roads/cycle lanes that you regularly use in terms of safety?** You can indicate your answer on a scale from 1 to 7, where 1 is "very unsafe" and 7 is "very safe". The numbers in between can be used to refine your response.
Binary variable: safe (5-7) - unsafe/neutral (1-4)
Items (random order):
- rural roads and roads connecting towns and villages with cycle lanes
- rural roads and roads connecting towns and villages without cycle lanes
- streets and roads in urban areas with cycle lanes
- streets and roads in urban areas without cycle lanes

**Q25_4_a) As a PEDESTRIAN, what type of roads/sidewalks do you regularly use in [country]?** You can indicate multiple answers: rural roads and roads connecting towns and villages with sidewalks - rural roads and roads connecting towns and villages without sidewalks - streets and roads in urban areas with sidewalks - streets and roads in urban areas without sidewalks

**Q25_4_b) As a PEDESTRIAN, how would you rate the roads/sidewalks that you regularly use in terms of safety?** You can indicate your answer on a scale from 1 to 7, where 1 is "very unsafe" and 7 is "very safe". The numbers in between can be used to refine your response.
Binary variable: safe (5-7) - unsafe/neutral (1-4)
Items (random order):
- rural roads and roads connecting towns and villages with sidewalks
- rural roads and roads connecting towns and villages without sidewalks
- streets and roads in urban areas with sidewalks
- streets and roads in urban areas without sidewalks

## Social desirability scale

Introduction: The survey is almost finished. Some of the following questions[10] have nothing to do with road safety, but they are important background information. There are no good or bad answers.

**Q26) To what extent do you agree with each of the following statements?** You

[10] Q26 is asked together with some last questions on sociodemographic information, which have already been listed in the beginning of the questionnaire.

can indicate your answer on a scale from 1 to 5, where 1 is “disagree” and 5 is “agree”. The numbers in between can be used to refine your response.
Items (random order; instructed response item (trick item) as last item):

- In an argument, I always remain objective and stick to the facts.
- Even if I am feeling stressed, I am always friendly and polite to others.
- When talking to someone, I always listen carefully to what the other person says.
- It has happened that I have taken advantage of someone in the past.
- I have occasionally thrown litter away in the countryside or on to the road.
- Sometimes I only help people if I expect to get something in return.
- Please, select the answer option number 5 "agree". (Instructed response item (trick item))

Closing comment: Thank you for your contribution!

# Appendix B

# PCA results for speeding

The tables in this appendix report the principal component loadings and the percentage of total variance explained for the pooled cross-national solution and the country-specific solutions. The loadings describe the relationships between observed items and the retained principal component. The respondent-level variables used in the regression analyses were component *scores*, not component loadings.

**Table B.1:** PCA component loadings and explained variance for speeding: Americas.

| Construct | ESRA3 variable | Cross-national model | | Brazil | | Canada | | Chile | | Mexico | | United States | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 70.1 | | 72.4 | | 72.3 | | 70.4 | | 76.5 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.876 | | 0.898 | | 0.875 | | 0.876 | | 0.896 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.876 | | 0.895 | | 0.882 | | 0.854 | | 0.915 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.729 | | 0.734 | | 0.767 | | 0.794 | | 0.784 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.860 | | 0.866 | | 0.870 | | 0.829 | | 0.898 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 53.7 | | 56.4 | | 45.9 | | 48.3 | | 62.3 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.689 | | 0.703 | | 0.490 | | 0.631 | | 0.731 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.747 | | 0.780 | | 0.709 | | 0.740 | | 0.843 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.647 | | 0.642 | | 0.638 | | 0.606 | | 0.744 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.768 | | 0.804 | | 0.770 | | 0.752 | | 0.824 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.803 | | 0.813 | | 0.743 | | 0.733 | | 0.799 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 64.4 | | 68.6 | | 65.1 | | 63.2 | | 71.6 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.763 | | 0.833 | | 0.734 | | 0.673 | | 0.838 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.840 | | 0.855 | | 0.860 | | 0.864 | | 0.872 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.860 | | 0.896 | | 0.870 | | 0.839 | | 0.895 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.711 | | 0.706 | | 0.739 | | 0.777 | | 0.790 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.830 | | 0.838 | | 0.820 | | 0.809 | | 0.831 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 71.1 | | 73.3 | | 67.7 | | 70.9 | | 73.6 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.837 | | 0.878 | | 0.855 | | 0.841 | | 0.881 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.875 | | 0.870 | | 0.824 | | 0.873 | | 0.876 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.816 | | 0.820 | | 0.789 | | 0.811 | | 0.816 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.6 | | 60.7 | | 55.8 | | 54.3 | | 74.9 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.778 | | 0.777 | | 0.759 | | 0.733 | | 0.866 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.743 | | 0.770 | | 0.758 | | 0.712 | | 0.852 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.755 | | 0.790 | | 0.724 | | 0.764 | | 0.878 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.6 | | 55.5 | | 52.9 | | 50.8 | | 61.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.791 | | 0.747 | | 0.793 | | 0.795 | | 0.802 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.733 | | 0.762 | | 0.666 | | 0.733 | | 0.820 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.733 | | 0.725 | | 0.718 | | 0.595 | | 0.729 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.2:** PCA component loadings and explained variance for speeding: Asia-Oceania.

| Construct | ESRA3 variable | Cross-national model | | Australia | | Israel | | Japan | | Thailand | | Türkiye | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 74.7 | | 67.8 | | 73.9 | | 74.8 | | 67.1 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.905 | | 0.878 | | 0.907 | | 0.890 | | 0.795 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.886 | | 0.892 | | 0.900 | | 0.878 | | 0.843 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.810 | | 0.652 | | 0.790 | | 0.848 | | 0.784 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.852 | | 0.849 | | 0.838 | | 0.844 | | 0.851 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.3 | | 42.9 | | 54.3 | | 56.9 | | 52.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.712 | | 0.408 | | 0.568 | | 0.573 | | 0.526 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.750 | | 0.665 | | 0.788 | | 0.786 | | 0.813 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.708 | | 0.647 | | 0.689 | | 0.765 | | 0.750 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.831 | | 0.754 | | 0.806 | | 0.828 | | 0.735 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.840 | | 0.740 | | 0.805 | | 0.794 | | 0.759 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 74.6 | | 68.1 | | 72.1 | | 65.8 | | 63.2 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.825 | | 0.765 | | 0.820 | | 0.719 | | 0.801 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.894 | | 0.851 | | 0.889 | | 0.857 | | 0.768 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.910 | | 0.904 | | 0.903 | | 0.867 | | 0.860 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.794 | | 0.706 | | 0.763 | | 0.836 | | 0.717 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.889 | | 0.882 | | 0.863 | | 0.768 | | 0.821 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 68.0 | | 65.4 | | 70.4 | | 67.1 | | 67.6 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.838 | | 0.832 | | 0.852 | | 0.844 | | 0.843 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.823 | | 0.863 | | 0.858 | | 0.843 | | 0.832 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.812 | | 0.725 | | 0.807 | | 0.769 | | 0.791 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.0 | | 54.2 | | 62.4 | | 67.1 | | 62.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.825 | | 0.670 | | 0.774 | | 0.797 | | 0.792 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.847 | | 0.771 | | 0.762 | | 0.836 | | 0.774 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.873 | | 0.764 | | 0.832 | | 0.825 | | 0.804 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 62.4 | | 52.9 | | 55.7 | | 58.3 | | 55.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.797 | | 0.760 | | 0.780 | | 0.756 | | 0.764 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.796 | | 0.698 | | 0.679 | | 0.813 | | 0.739 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.778 | | 0.722 | | 0.776 | | 0.718 | | 0.738 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.3:** PCA component loadings and explained variance for speeding: Europe I.

| Construct | ESRA3 variable | Cross-national model | | Austria | | Belgium | | Bosnia and Herzegovina | | Czech Republic | | Denmark | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 68.1 | | 71.7 | | 68.4 | | 62.7 | | 71.8 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.826 | | 0.864 | | 0.854 | | 0.848 | | 0.867 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.895 | | 0.901 | | 0.901 | | 0.849 | | 0.877 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.697 | | 0.753 | | 0.701 | | 0.646 | | 0.776 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.869 | | 0.861 | | 0.839 | | 0.805 | | 0.865 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 43.0 | | 53.5 | | 49.2 | | 45.6 | | 59.6 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.497 | | 0.686 | | 0.618 | | 0.396 | | 0.770 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.695 | | 0.776 | | 0.781 | | 0.712 | | 0.832 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.652 | | 0.622 | | 0.503 | | 0.583 | | 0.659 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.675 | | 0.767 | | 0.797 | | 0.781 | | 0.810 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.736 | | 0.792 | | 0.762 | | 0.814 | | 0.776 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 60.7 | | 70.5 | | 60.7 | | 66.0 | | 73.2 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.703 | | 0.837 | | 0.607 | | 0.865 | | 0.864 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.766 | | 0.853 | | 0.842 | | 0.809 | | 0.866 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.883 | | 0.904 | | 0.856 | | 0.891 | | 0.921 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.659 | | 0.727 | | 0.719 | | 0.625 | | 0.737 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.860 | | 0.866 | | 0.842 | | 0.845 | | 0.879 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 70.9 | | 71.3 | | 67.2 | | 71.7 | | 71.2 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.863 | | 0.857 | | 0.843 | | 0.851 | | 0.855 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.875 | | 0.866 | | 0.867 | | 0.874 | | 0.872 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.787 | | 0.809 | | 0.743 | | 0.814 | | 0.803 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.9 | | 61.7 | | 56.1 | | 55.8 | | 64.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.771 | | 0.784 | | 0.711 | | 0.767 | | 0.788 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.811 | | 0.774 | | 0.726 | | 0.697 | | 0.793 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.696 | | 0.797 | | 0.806 | | 0.774 | | 0.827 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 53.5 | | 52.4 | | 46.2 | | 52.1 | | 53.9 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.794 | | 0.749 | | 0.723 | | 0.728 | | 0.746 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.642 | | 0.710 | | 0.707 | | 0.750 | | 0.738 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.712 | | 0.603 | | 0.687 | | 0.718 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.4:** PCA component loadings and explained variance for speeding: Europe II.

| Construct | ESRA3 variable | Cross-national model | | Finland | | France | | Germany | | Greece | | Ireland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 66.9 | | 72.7 | | 67.4 | | 65.0 | | 68.9 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.877 | | 0.864 | | 0.832 | | 0.826 | | 0.853 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.853 | | 0.890 | | 0.882 | | 0.874 | | 0.888 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.629 | | 0.783 | | 0.744 | | 0.665 | | 0.753 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.885 | | 0.870 | | 0.821 | | 0.843 | | 0.821 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 46.8 | | 51.3 | | 46.6 | | 45.3 | | 55.0 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.527 | | 0.651 | | 0.548 | | 0.583 | | 0.662 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.737 | | 0.760 | | 0.699 | | 0.623 | | 0.773 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.654 | | 0.583 | | 0.587 | | 0.572 | | 0.678 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.755 | | 0.770 | | 0.763 | | 0.765 | | 0.792 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.722 | | 0.794 | | 0.784 | | 0.791 | | 0.792 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 66.0 | | 72.0 | | 68.3 | | 63.3 | | 69.6 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.809 | | 0.855 | | 0.819 | | 0.692 | | 0.775 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.833 | | 0.863 | | 0.824 | | 0.822 | | 0.849 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.921 | | 0.907 | | 0.886 | | 0.857 | | 0.903 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.587 | | 0.729 | | 0.704 | | 0.747 | | 0.791 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.870 | | 0.878 | | 0.886 | | 0.846 | | 0.847 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 73.5 | | 72.1 | | 70.6 | | 71.4 | | 67.4 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.860 | | 0.857 | | 0.854 | | 0.841 | | 0.838 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.858 | | 0.868 | | 0.888 | | 0.862 | | 0.838 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.853 | | 0.820 | | 0.775 | | 0.831 | | 0.785 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 58.0 | | 67.2 | | 66.0 | | 55.8 | | 53.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.714 | | 0.835 | | 0.829 | | 0.767 | | 0.751 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.796 | | 0.792 | | 0.830 | | 0.698 | | 0.703 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.772 | | 0.831 | | 0.776 | | 0.773 | | 0.739 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 50.1 | | 64.1 | | 58.1 | | 50.5 | | 53.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.809 | | 0.836 | | 0.781 | | 0.764 | | 0.726 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.638 | | 0.775 | | 0.734 | | 0.649 | | 0.748 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.665 | | 0.789 | | 0.772 | | 0.715 | | 0.726 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.5:** PCA component loadings and explained variance for speeding: Europe III.

| Construct | ESRA3 variable | Cross-national model | | Italy | | Latvia | | Netherlands | | Poland | | Portugal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 70.5 | | 71.3 | | 71.1 | | 71.2 | | 67.5 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.858 | | 0.877 | | 0.849 | | 0.864 | | 0.847 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.866 | | 0.908 | | 0.909 | | 0.884 | | 0.899 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.764 | | 0.672 | | 0.749 | | 0.757 | | 0.710 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.865 | | 0.898 | | 0.858 | | 0.864 | | 0.818 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 52.0 | | 48.0 | | 52.7 | | 47.6 | | 46.7 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.644 | | 0.411 | | 0.732 | | 0.554 | | 0.577 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.774 | | 0.704 | | 0.774 | | 0.733 | | 0.716 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.621 | | 0.686 | | 0.502 | | 0.617 | | 0.588 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.763 | | 0.792 | | 0.742 | | 0.737 | | 0.751 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.785 | | 0.800 | | 0.835 | | 0.782 | | 0.760 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 69.6 | | 69.3 | | 70.1 | | 69.1 | | 66.8 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.817 | | 0.808 | | 0.846 | | 0.799 | | 0.815 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.858 | | 0.862 | | 0.846 | | 0.860 | | 0.875 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.888 | | 0.911 | | 0.911 | | 0.880 | | 0.897 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.740 | | 0.675 | | 0.712 | | 0.736 | | 0.628 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.860 | | 0.885 | | 0.858 | | 0.872 | | 0.844 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 69.8 | | 64.7 | | 68.7 | | 69.7 | | 65.3 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.843 | | 0.810 | | 0.824 | | 0.841 | | 0.837 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.853 | | 0.861 | | 0.860 | | 0.866 | | 0.842 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.809 | | 0.737 | | 0.802 | | 0.797 | | 0.741 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 60.7 | | 54.9 | | 59.7 | | 60.0 | | 55.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.765 | | 0.792 | | 0.784 | | 0.815 | | 0.697 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.778 | | 0.687 | | 0.754 | | 0.769 | | 0.758 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.795 | | 0.740 | | 0.781 | | 0.738 | | 0.772 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.0 | | 49.0 | | 56.6 | | 56.3 | | 51.5 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.770 | | 0.723 | | 0.747 | | 0.811 | | 0.812 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.723 | | 0.622 | | 0.756 | | 0.674 | | 0.513 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.749 | | 0.755 | | 0.759 | | 0.789 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.6:** PCA component loadings and explained variance for speeding: Europe IV.

| Construct | ESRA3 variable | Cross-national model | | Serbia | | Slovenia | | Spain | | Sweden | | Switzerland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 60.3 | | 62.5 | | 72.2 | | 70.3 | | 71.2 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.830 | | 0.801 | | 0.873 | | 0.850 | | 0.852 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.871 | | 0.866 | | 0.897 | | 0.882 | | 0.895 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.622 | | 0.690 | | 0.770 | | 0.744 | | 0.751 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.761 | | 0.795 | | 0.853 | | 0.869 | | 0.870 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 48.3 | | 42.3 | | 56.5 | | 58.5 | | 50.2 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.540 | | 0.446 | | 0.759 | | 0.742 | | 0.686 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.734 | | 0.680 | | 0.795 | | 0.813 | | 0.710 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.663 | | 0.536 | | 0.596 | | 0.673 | | 0.695 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.752 | | 0.779 | | 0.793 | | 0.778 | | 0.712 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.760 | | 0.750 | | 0.797 | | 0.811 | | 0.738 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 60.6 | | 63.7 | | 69.1 | | 69.3 | | 70.3 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.700 | | 0.820 | | 0.799 | | 0.810 | | 0.852 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.815 | | 0.772 | | 0.851 | | 0.798 | | 0.821 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.875 | | 0.885 | | 0.891 | | 0.907 | | 0.917 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.627 | | 0.638 | | 0.738 | | 0.750 | | 0.725 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.847 | | 0.851 | | 0.868 | | 0.888 | | 0.866 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 69.0 | | 70.9 | | 73.2 | | 74.5 | | 73.1 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.853 | | 0.831 | | 0.875 | | 0.890 | | 0.866 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.871 | | 0.856 | | 0.865 | | 0.876 | | 0.875 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.763 | | 0.839 | | 0.825 | | 0.822 | | 0.823 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 53.4 | | 62.5 | | 62.6 | | 60.2 | | 67.7 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.772 | | 0.773 | | 0.787 | | 0.738 | | 0.809 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.702 | | 0.801 | | 0.800 | | 0.789 | | 0.836 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.716 | | 0.797 | | 0.786 | | 0.800 | | 0.822 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 51.8 | | 52.8 | | 54.8 | | 55.2 | | 55.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.737 | | 0.778 | | 0.799 | | 0.798 | | 0.772 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.726 | | 0.662 | | 0.708 | | 0.764 | | 0.766 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.696 | | 0.735 | | 0.711 | | 0.660 | | 0.696 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table B.7:** PCA component loadings and explained variance for speeding: Europe V.

| Construct | ESRA3 variable | Cross-national model | | United Kingdom | |
|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | |
| Self-reported speeding1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 70.2 | | 68.1 |
| | – Drive faster than the speed limit inside built-up areas? | 0.865 | | 0.871 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.888 | | 0.853 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.735 | | 0.716 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.856 | | 0.852 | |
| **Socio-cognitive constructs** | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.765 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.802 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.665 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.766 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.844 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 68.5 | | 72.2 |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.805 | | 0.834 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | |
| | – Drive faster than the speed limit inside built-up areas? | 0.845 | | 0.895 | |
| | – Drive faster than the speed limit outside built-up areas (except motorways/freeways)? | 0.897 | | 0.898 | |
| | – Drive too fast for the road/traffic conditions at the time (e.g., poor visibility, dense traffic, presence of vulnerable road users)? | 0.719 | | 0.747 | |
| | – Drive faster than the speed limit on motorways/freeways? | 0.862 | | 0.864 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 71.2 | | 69.8 |
| | – I trust myself when I drive significantly faster than the speed limit. | 0.856 | | 0.858 | |
| | – I have the ability to drive significantly faster than the speed limit. | 0.866 | | 0.855 | |
| | – I am able to drive fast through a sharp curve. | 0.808 | | 0.792 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. |
| | – I intend to respect speed limits in the next 30 days. | z-score | | z-score | |
| **Social desirability** | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.850 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.839 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.860 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 57.1 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.693 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.795 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.775 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

# Appendix C

# PCA results for driving under the influence

The tables report the principal component loadings and explained variance for driving under the influence (DUI) of alcohol, drugs or medication and its TPB-inspired socio-cognitive indicators. As in Appendix B, the regression analyses used respondent-level component scores.

**Table C.1:** PCA component loadings and explained variance for DUI: Americas.

| Construct | ESRA3 variable | Cross-national model | | Brazil | | Canada | | Chile | | Mexico | | United States | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 57.6 | | 75.7 | | 69.9 | | 66.3 | | 78.1 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.841 | | 0.888 | | 0.894 | | 0.841 | | 0.904 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.808 | | 0.848 | | 0.868 | | 0.807 | | 0.886 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.831 | | 0.884 | | 0.863 | | 0.820 | | 0.860 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.762 | | 0.860 | | 0.705 | | 0.788 | | 0.885 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 43.0 | | 56.4 | | 45.9 | | 48.3 | | 62.3 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.689 | | 0.703 | | 0.490 | | 0.631 | | 0.731 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.747 | | 0.780 | | 0.709 | | 0.740 | | 0.843 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.647 | | 0.642 | | 0.638 | | 0.606 | | 0.744 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.768 | | 0.804 | | 0.770 | | 0.752 | | 0.824 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.803 | | 0.813 | | 0.743 | | 0.733 | | 0.799 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 56.1 | | 68.2 | | 64.2 | | 55.0 | | 73.0 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.756 | | 0.811 | | 0.782 | | 0.683 | | 0.813 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.875 | | 0.869 | | 0.876 | | 0.841 | | 0.885 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.833 | | 0.835 | | 0.836 | | 0.769 | | 0.866 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.765 | | 0.786 | | 0.702 | | 0.657 | | 0.851 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 62.6 | | 65.0 | | 69.3 | | 61.0 | | 73.8 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.778 | | 0.698 | | 0.801 | | 0.755 | | 0.832 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.892 | | 0.879 | | 0.874 | | 0.850 | | 0.884 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.839 | | 0.830 | | 0.822 | | 0.733 | | 0.860 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.6 | | 60.7 | | 55.8 | | 54.3 | | 74.9 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.778 | | 0.777 | | 0.759 | | 0.733 | | 0.866 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.743 | | 0.770 | | 0.758 | | 0.712 | | 0.852 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.755 | | 0.790 | | 0.724 | | 0.764 | | 0.878 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.6 | | 55.5 | | 52.9 | | 50.8 | | 61.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.791 | | 0.747 | | 0.793 | | 0.795 | | 0.802 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.733 | | 0.762 | | 0.666 | | 0.733 | | 0.820 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.733 | | 0.725 | | 0.718 | | 0.595 | | 0.729 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.2:** PCA component loadings and explained variance for DUI: Asia-Oceania.

| Construct | ESRA3 variable | Cross-national model | | Australia | | Israel | | Japan | | Thailand | | Türkiye | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 70.1 | | 61.2 | | 61.9 | | 74.2 | | 79.8 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.858 | | 0.869 | | 0.845 | | 0.880 | | 0.904 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.818 | | 0.843 | | 0.888 | | 0.865 | | 0.903 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.845 | | 0.707 | | 0.770 | | 0.831 | | 0.910 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.826 | | 0.694 | | 0.618 | | 0.869 | | 0.856 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.3 | | 42.9 | | 54.3 | | 56.9 | | 52.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.712 | | 0.408 | | 0.568 | | 0.573 | | 0.526 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.750 | | 0.665 | | 0.788 | | 0.786 | | 0.813 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.708 | | 0.647 | | 0.689 | | 0.765 | | 0.750 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.831 | | 0.754 | | 0.806 | | 0.828 | | 0.735 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.840 | | 0.740 | | 0.805 | | 0.794 | | 0.759 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 66.2 | | 53.8 | | 69.8 | | 69.5 | | 67.8 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.813 | | 0.573 | | 0.857 | | 0.799 | | 0.778 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.866 | | 0.831 | | 0.888 | | 0.868 | | 0.874 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.780 | | 0.789 | | 0.880 | | 0.813 | | 0.879 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.794 | | 0.716 | | 0.705 | | 0.852 | | 0.755 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 63.7 | | 67.0 | | 71.4 | | 74.7 | | 62.6 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.620 | | 0.816 | | 0.785 | | 0.858 | | 0.795 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.885 | | 0.846 | | 0.875 | | 0.907 | | 0.865 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.862 | | 0.793 | | 0.871 | | 0.825 | | 0.705 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.0 | | 54.2 | | 62.4 | | 67.1 | | 62.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.825 | | 0.670 | | 0.774 | | 0.797 | | 0.792 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.847 | | 0.771 | | 0.762 | | 0.836 | | 0.774 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.873 | | 0.764 | | 0.832 | | 0.825 | | 0.804 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 62.4 | | 52.9 | | 55.7 | | 58.3 | | 55.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.797 | | 0.760 | | 0.780 | | 0.756 | | 0.764 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.796 | | 0.698 | | 0.679 | | 0.813 | | 0.739 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.778 | | 0.722 | | 0.776 | | 0.718 | | 0.738 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.3:** PCA component loadings and explained variance for DUI: Europe I.

| Construct | ESRA3 variable | Cross-national model | | Austria | | Belgium | | Bosnia and Herzegovina | | Czech Republic | | Denmark | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 57.6 | | 67.9 | | 52.2 | | 65.1 | | 77.2 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.828 | | 0.876 | | 0.805 | | 0.860 | | 0.921 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.719 | | 0.850 | | 0.782 | | 0.839 | | 0.844 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.778 | | 0.811 | | 0.708 | | 0.739 | | 0.896 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.705 | | 0.752 | | 0.572 | | 0.784 | | 0.853 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 43.0 | | 53.5 | | 49.2 | | 45.6 | | 59.6 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.497 | | 0.686 | | 0.618 | | 0.396 | | 0.770 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.695 | | 0.776 | | 0.781 | | 0.712 | | 0.832 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.652 | | 0.622 | | 0.503 | | 0.583 | | 0.659 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.675 | | 0.767 | | 0.797 | | 0.781 | | 0.810 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.736 | | 0.792 | | 0.762 | | 0.814 | | 0.776 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 56.1 | | 65.7 | | 56.7 | | 56.1 | | 74.9 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.629 | | 0.815 | | 0.509 | | 0.754 | | 0.896 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.825 | | 0.874 | | 0.853 | | 0.833 | | 0.887 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.821 | | 0.791 | | 0.823 | | 0.765 | | 0.878 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.703 | | 0.756 | | 0.778 | | 0.630 | | 0.798 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 62.6 | | 71.9 | | 65.4 | | 69.6 | | 66.1 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.739 | | 0.798 | | 0.703 | | 0.807 | | 0.609 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.848 | | 0.887 | | 0.886 | | 0.855 | | 0.909 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.783 | | 0.857 | | 0.826 | | 0.841 | | 0.887 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.9 | | 61.7 | | 56.1 | | 55.8 | | 64.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.771 | | 0.784 | | 0.711 | | 0.767 | | 0.788 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.811 | | 0.774 | | 0.726 | | 0.697 | | 0.793 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.696 | | 0.797 | | 0.806 | | 0.774 | | 0.827 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 53.5 | | 52.4 | | 46.2 | | 52.1 | | 53.9 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.794 | | 0.749 | | 0.723 | | 0.728 | | 0.746 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.642 | | 0.710 | | 0.707 | | 0.750 | | 0.738 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.712 | | 0.603 | | 0.687 | | 0.718 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.4:** PCA component loadings and explained variance for DUI: Europe II.

| Construct | ESRA3 variable | Cross-national model | | Finland | | France | | Germany | | Greece | | Ireland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 64.2 | | 69.1 | | 76.9 | | 54.2 | | 69.4 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.853 | | 0.844 | | 0.921 | | 0.792 | | 0.880 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.854 | | 0.854 | | 0.859 | | 0.782 | | 0.862 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.809 | | 0.839 | | 0.887 | | 0.682 | | 0.808 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.676 | | 0.787 | | 0.837 | | 0.682 | | 0.778 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 46.8 | | 51.3 | | 46.6 | | 45.3 | | 55.0 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.527 | | 0.651 | | 0.548 | | 0.583 | | 0.662 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.737 | | 0.760 | | 0.699 | | 0.623 | | 0.773 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.654 | | 0.583 | | 0.587 | | 0.572 | | 0.678 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.755 | | 0.770 | | 0.763 | | 0.765 | | 0.792 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.722 | | 0.794 | | 0.784 | | 0.791 | | 0.792 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 54.8 | | 68.1 | | 65.9 | | 58.1 | | 67.9 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.653 | | 0.786 | | 0.705 | | 0.616 | | 0.810 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.847 | | 0.882 | | 0.880 | | 0.873 | | 0.872 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.847 | | 0.837 | | 0.840 | | 0.827 | | 0.824 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.575 | | 0.792 | | 0.814 | | 0.708 | | 0.788 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 66.1 | | 65.5 | | 64.3 | | 57.0 | | 64.7 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.716 | | 0.751 | | 0.787 | | 0.643 | | 0.662 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.873 | | 0.864 | | 0.871 | | 0.802 | | 0.878 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.841 | | 0.808 | | 0.743 | | 0.809 | | 0.855 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 58.0 | | 67.2 | | 66.0 | | 55.8 | | 53.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.714 | | 0.835 | | 0.829 | | 0.767 | | 0.751 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.796 | | 0.792 | | 0.830 | | 0.698 | | 0.703 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.772 | | 0.831 | | 0.776 | | 0.773 | | 0.739 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 50.1 | | 64.1 | | 58.1 | | 50.5 | | 53.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.809 | | 0.836 | | 0.781 | | 0.764 | | 0.726 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.638 | | 0.775 | | 0.734 | | 0.649 | | 0.748 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.665 | | 0.789 | | 0.772 | | 0.715 | | 0.726 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.5:** PCA component loadings and explained variance for DUI: Europe III.

| Construct | ESRA3 variable | Cross-national model | | Italy | | Latvia | | Netherlands | | Poland | | Portugal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 72.3 | | 59.3 | | 67.0 | | 65.7 | | 58.9 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.891 | | 0.804 | | 0.867 | | 0.878 | | 0.820 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.863 | | 0.804 | | 0.809 | | 0.799 | | 0.673 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.875 | | 0.750 | | 0.824 | | 0.823 | | 0.807 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.768 | | 0.721 | | 0.771 | | 0.737 | | 0.761 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 52.0 | | 48.0 | | 52.7 | | 47.6 | | 46.7 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.644 | | 0.411 | | 0.732 | | 0.554 | | 0.577 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.774 | | 0.704 | | 0.774 | | 0.733 | | 0.716 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.621 | | 0.686 | | 0.502 | | 0.617 | | 0.588 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.763 | | 0.792 | | 0.742 | | 0.737 | | 0.751 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.785 | | 0.800 | | 0.835 | | 0.782 | | 0.760 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 66.7 | | 54.3 | | 67.1 | | 59.9 | | 55.4 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.800 | | 0.506 | | 0.808 | | 0.678 | | 0.727 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.891 | | 0.863 | | 0.878 | | 0.852 | | 0.827 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.843 | | 0.824 | | 0.855 | | 0.827 | | 0.748 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.723 | | 0.700 | | 0.727 | | 0.725 | | 0.667 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 66.1 | | 68.5 | | 60.5 | | 65.9 | | 61.9 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.772 | | 0.776 | | 0.611 | | 0.790 | | 0.681 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.872 | | 0.880 | | 0.852 | | 0.839 | | 0.855 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.791 | | 0.825 | | 0.845 | | 0.806 | | 0.814 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 60.7 | | 54.9 | | 59.7 | | 60.0 | | 55.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.765 | | 0.792 | | 0.784 | | 0.815 | | 0.697 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.778 | | 0.687 | | 0.754 | | 0.769 | | 0.758 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.795 | | 0.740 | | 0.781 | | 0.738 | | 0.772 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.0 | | 49.0 | | 56.6 | | 56.3 | | 51.5 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.770 | | 0.723 | | 0.747 | | 0.811 | | 0.812 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.723 | | 0.622 | | 0.756 | | 0.674 | | 0.513 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.749 | | 0.755 | | 0.759 | | 0.789 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.6:** PCA component loadings and explained variance for DUI: Europe IV.

| Construct | ESRA3 variable | Cross-national model | | Serbia | | Slovenia | | Spain | | Sweden | | Switzerland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 47.8 | | 62.8 | | 69.4 | | 85.3 | | 68.3 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.816 | | 0.838 | | 0.901 | | 0.926 | | 0.845 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.839 | | 0.737 | | 0.833 | | 0.941 | | 0.849 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.565 | | 0.782 | | 0.835 | | 0.941 | | 0.817 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.475 | | 0.810 | | 0.756 | | 0.885 | | 0.794 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 48.3 | | 42.3 | | 56.5 | | 58.5 | | 50.2 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.540 | | 0.446 | | 0.759 | | 0.742 | | 0.686 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.734 | | 0.680 | | 0.795 | | 0.813 | | 0.710 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.663 | | 0.536 | | 0.596 | | 0.673 | | 0.695 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.752 | | 0.779 | | 0.793 | | 0.778 | | 0.712 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.760 | | 0.750 | | 0.797 | | 0.811 | | 0.738 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 45.7 | | 52.4 | | 60.4 | | 72.0 | | 62.8 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.638 | | 0.666 | | 0.781 | | 0.829 | | 0.800 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.809 | | 0.812 | | 0.849 | | 0.895 | | 0.841 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.699 | | 0.731 | | 0.828 | | 0.893 | | 0.766 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.527 | | 0.679 | | 0.631 | | 0.772 | | 0.761 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 68.7 | | 65.5 | | 67.4 | | 74.8 | | 66.0 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.761 | | 0.802 | | 0.729 | | 0.807 | | 0.745 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.904 | | 0.841 | | 0.876 | | 0.918 | | 0.880 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.814 | | 0.784 | | 0.850 | | 0.867 | | 0.807 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 53.4 | | 62.5 | | 62.6 | | 60.2 | | 67.7 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.772 | | 0.773 | | 0.787 | | 0.738 | | 0.809 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.702 | | 0.801 | | 0.800 | | 0.789 | | 0.836 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.716 | | 0.797 | | 0.786 | | 0.800 | | 0.822 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 51.8 | | 52.8 | | 54.8 | | 55.2 | | 55.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.737 | | 0.778 | | 0.799 | | 0.798 | | 0.772 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.726 | | 0.662 | | 0.708 | | 0.764 | | 0.766 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.696 | | 0.735 | | 0.711 | | 0.660 | | 0.696 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table C.7:** PCA component loadings and explained variance for DUI: Europe V.

| Construct | ESRA3 variable | Cross-national model | | United Kingdom | |
|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | |
| Self-reported DUI1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 69.1 | | 78.1 |
| | – Drive when you may have been over the legal limit for drinking and driving? | 0.869 | | 0.906 | |
| | – Drive after drinking alcohol? | 0.827 | | 0.847 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.834 | | 0.881 | |
| | – Drive within 2 hours after taking medication that may affect your driving ability? | 0.793 | | 0.899 | |
| **Socio-cognitive constructs** | | | | | |
| Attitudes2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.765 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.802 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.665 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.766 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.844 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 62.8 | | 72.0 |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.747 | | 0.786 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | |
| | – Drive when he/she may be over the legal limit for drinking and driving? | 0.858 | | 0.903 | |
| | – Drive within 1 hour after taking drugs (other than prescribed or over the counter medication)? | 0.813 | | 0.885 | |
| | – Drive within 2 hours after taking a medication that may affect the driving ability? | 0.745 | | 0.815 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 65.7 | | 55.8 |
| | – I trust myself to drive after drinking a small amount of alcohol (e.g., one glass of wine or one pint of beer). | 0.743 | | 0.640 | |
| | – I have the ability to drive when I am a little drunk after a party. | 0.869 | | 0.830 | |
| | – I am able to drive after drinking a large amount of alcohol (e.g., a bottle of wine). | 0.816 | | 0.758 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. |
| | – I intend not to drive after drinking alcohol in the next 30 days. | z-score | | z-score | |
| **Social desirability** | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.850 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.839 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.860 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 57.1 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.693 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.795 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.775 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

# Appendix D

# PCA results for mobile phone use while driving

The tables report the principal component loadings and explained variance for mobile phone use while driving and its TPB-inspired socio-cognitive indicators. The tables contain item-level loadings; the regression models used respondent-level component scores.

**Table D.1:** PCA component loadings and explained variance for mobile phone use while driving: Americas.

| Construct | ESRA3 variable | Cross-national model | | Brazil | | Canada | | Chile | | Mexico | | United States | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 67.2 | | 65.1 | | 60.2 | | 60.2 | | 70.2 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.888 | | 0.860 | | 0.811 | | 0.839 | | 0.887 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.695 | | 0.703 | | 0.664 | | 0.633 | | 0.761 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.864 | | 0.847 | | 0.841 | | 0.838 | | 0.861 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 53.7 | | 56.4 | | 45.9 | | 48.3 | | 62.3 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.689 | | 0.703 | | 0.490 | | 0.631 | | 0.731 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.747 | | 0.780 | | 0.709 | | 0.740 | | 0.843 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.647 | | 0.642 | | 0.638 | | 0.606 | | 0.744 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.768 | | 0.804 | | 0.770 | | 0.752 | | 0.824 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.803 | | 0.813 | | 0.743 | | 0.733 | | 0.799 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 58.5 | | 61.3 | | 52.0 | | 52.3 | | 64.0 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.821 | | 0.855 | | 0.751 | | 0.783 | | 0.877 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.828 | | 0.838 | | 0.809 | | 0.768 | | 0.850 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.834 | | 0.828 | | 0.801 | | 0.781 | | 0.841 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.425 | | 0.466 | | 0.312 | | 0.415 | | 0.565 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.830 | | 0.855 | | 0.801 | | 0.793 | | 0.827 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 76.9 | | 72.0 | | 71.6 | | 69.9 | | 76.8 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.882 | | 0.872 | | 0.861 | | 0.855 | | 0.892 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.881 | | 0.861 | | 0.857 | | 0.844 | | 0.889 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.867 | | 0.811 | | 0.819 | | 0.807 | | 0.848 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.6 | | 60.7 | | 55.8 | | 54.3 | | 74.9 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.778 | | 0.777 | | 0.759 | | 0.733 | | 0.866 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.743 | | 0.770 | | 0.758 | | 0.712 | | 0.852 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.755 | | 0.790 | | 0.724 | | 0.764 | | 0.878 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.6 | | 55.5 | | 52.9 | | 50.8 | | 61.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.791 | | 0.747 | | 0.793 | | 0.795 | | 0.802 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.733 | | 0.762 | | 0.666 | | 0.733 | | 0.820 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.733 | | 0.725 | | 0.718 | | 0.595 | | 0.729 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.2:** PCA component loadings and explained variance for mobile phone use while driving: Asia-Oceania.

| Construct | ESRA3 variable | Cross-national model | | Australia | | Israel | | Japan | | Thailand | | Türkiye | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 63.7 | | 57.7 | | 62.0 | | 70.1 | | 65.5 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.854 | | 0.774 | | 0.842 | | 0.906 | | 0.844 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.686 | | 0.637 | | 0.631 | | 0.723 | | 0.711 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.844 | | 0.853 | | 0.867 | | 0.872 | | 0.865 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.3 | | 42.9 | | 54.3 | | 56.9 | | 52.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.712 | | 0.408 | | 0.568 | | 0.573 | | 0.526 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.750 | | 0.665 | | 0.788 | | 0.786 | | 0.813 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.708 | | 0.647 | | 0.689 | | 0.765 | | 0.750 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.831 | | 0.754 | | 0.806 | | 0.828 | | 0.735 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.840 | | 0.740 | | 0.805 | | 0.794 | | 0.759 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 60.5 | | 53.6 | | 61.5 | | 58.5 | | 60.3 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.860 | | 0.764 | | 0.861 | | 0.814 | | 0.835 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.870 | | 0.749 | | 0.811 | | 0.762 | | 0.836 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.848 | | 0.789 | | 0.879 | | 0.833 | | 0.822 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.354 | | 0.537 | | 0.400 | | 0.526 | | 0.524 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.826 | | 0.789 | | 0.862 | | 0.843 | | 0.818 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 65.6 | | 72.2 | | 61.9 | | 77.5 | | 70.8 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.836 | | 0.849 | | 0.831 | | 0.892 | | 0.853 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.819 | | 0.876 | | 0.805 | | 0.891 | | 0.827 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.774 | | 0.823 | | 0.720 | | 0.858 | | 0.845 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.0 | | 54.2 | | 62.4 | | 67.1 | | 62.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.825 | | 0.670 | | 0.774 | | 0.797 | | 0.792 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.847 | | 0.771 | | 0.762 | | 0.836 | | 0.774 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.873 | | 0.764 | | 0.832 | | 0.825 | | 0.804 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 62.4 | | 52.9 | | 55.7 | | 58.3 | | 55.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.797 | | 0.760 | | 0.780 | | 0.756 | | 0.764 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.796 | | 0.698 | | 0.679 | | 0.813 | | 0.739 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.778 | | 0.722 | | 0.776 | | 0.718 | | 0.738 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.3:** PCA component loadings and explained variance for mobile phone use while driving: Europe I.

| Construct | ESRA3 variable | Cross-national model | | Austria | | Belgium | | Bosnia and Herzegovina | | Czech Republic | | Denmark | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 56.3 | | 59.6 | | 58.9 | | 57.6 | | 65.7 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.803 | | 0.845 | | 0.875 | | 0.819 | | 0.869 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.594 | | 0.554 | | 0.509 | | 0.619 | | 0.680 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.831 | | 0.875 | | 0.861 | | 0.822 | | 0.869 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 43.0 | | 53.5 | | 49.2 | | 45.6 | | 59.6 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.497 | | 0.686 | | 0.618 | | 0.396 | | 0.770 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.695 | | 0.776 | | 0.781 | | 0.712 | | 0.832 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.652 | | 0.622 | | 0.503 | | 0.583 | | 0.659 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.675 | | 0.767 | | 0.797 | | 0.781 | | 0.810 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.736 | | 0.792 | | 0.762 | | 0.814 | | 0.776 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 47.4 | | 57.8 | | 51.7 | | 54.8 | | 62.8 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.744 | | 0.847 | | 0.820 | | 0.851 | | 0.851 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.754 | | 0.831 | | 0.774 | | 0.763 | | 0.849 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.768 | | 0.833 | | 0.763 | | 0.806 | | 0.859 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.330 | | 0.290 | | 0.390 | | 0.389 | | 0.469 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.741 | | 0.839 | | 0.760 | | 0.794 | | 0.857 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 73.5 | | 75.2 | | 74.6 | | 74.5 | | 74.5 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.893 | | 0.856 | | 0.858 | | 0.887 | | 0.869 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.881 | | 0.890 | | 0.865 | | 0.861 | | 0.876 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.793 | | 0.854 | | 0.867 | | 0.841 | | 0.843 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 57.9 | | 61.7 | | 56.1 | | 55.8 | | 64.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.771 | | 0.784 | | 0.711 | | 0.767 | | 0.788 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.811 | | 0.774 | | 0.726 | | 0.697 | | 0.793 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.696 | | 0.797 | | 0.806 | | 0.774 | | 0.827 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 53.5 | | 52.4 | | 46.2 | | 52.1 | | 53.9 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.794 | | 0.749 | | 0.723 | | 0.728 | | 0.746 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.642 | | 0.710 | | 0.707 | | 0.750 | | 0.738 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.712 | | 0.603 | | 0.687 | | 0.718 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.4:** PCA component loadings and explained variance for mobile phone use while driving: Europe II.

| Construct | ESRA3 variable | Cross-national model | | Finland | | France | | Germany | | Greece | | Ireland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 54.7 | | 66.2 | | 62.0 | | 54.5 | | 60.8 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.841 | | 0.895 | | 0.821 | | 0.795 | | 0.817 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.474 | | 0.639 | | 0.706 | | 0.547 | | 0.655 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.843 | | 0.882 | | 0.829 | | 0.839 | | 0.853 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 46.8 | | 51.3 | | 46.6 | | 45.3 | | 55.0 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.527 | | 0.651 | | 0.548 | | 0.583 | | 0.662 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.737 | | 0.760 | | 0.699 | | 0.623 | | 0.773 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.654 | | 0.583 | | 0.587 | | 0.572 | | 0.678 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.755 | | 0.770 | | 0.763 | | 0.765 | | 0.792 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.722 | | 0.794 | | 0.784 | | 0.791 | | 0.792 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 55.8 | | 64.7 | | 53.8 | | 51.6 | | 59.8 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.834 | | 0.882 | | 0.790 | | 0.828 | | 0.808 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.753 | | 0.873 | | 0.793 | | 0.811 | | 0.822 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.828 | | 0.861 | | 0.821 | | 0.754 | | 0.850 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.477 | | 0.445 | | 0.411 | | 0.302 | | 0.465 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.785 | | 0.869 | | 0.769 | | 0.759 | | 0.850 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 74.0 | | 76.5 | | 70.1 | | 70.1 | | 66.3 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.886 | | 0.907 | | 0.885 | | 0.854 | | 0.845 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.871 | | 0.848 | | 0.838 | | 0.833 | | 0.850 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.823 | | 0.868 | | 0.785 | | 0.824 | | 0.744 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 58.0 | | 67.2 | | 66.0 | | 55.8 | | 53.5 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.714 | | 0.835 | | 0.829 | | 0.767 | | 0.751 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.796 | | 0.792 | | 0.830 | | 0.698 | | 0.703 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.772 | | 0.831 | | 0.776 | | 0.773 | | 0.739 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 50.1 | | 64.1 | | 58.1 | | 50.5 | | 53.8 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.809 | | 0.836 | | 0.781 | | 0.764 | | 0.726 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.638 | | 0.775 | | 0.734 | | 0.649 | | 0.748 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.665 | | 0.789 | | 0.772 | | 0.715 | | 0.726 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.5:** PCA component loadings and explained variance for mobile phone use while driving: Europe III.

| Construct | ESRA3 variable | Cross-national model | | Italy | | Latvia | | Netherlands | | Poland | | Portugal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 61.4 | | 55.9 | | 59.7 | | 59.2 | | 56.0 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.861 | | 0.834 | | 0.841 | | 0.870 | | 0.806 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.552 | | 0.508 | | 0.589 | | 0.518 | | 0.552 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.893 | | 0.851 | | 0.860 | | 0.866 | | 0.851 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 52.0 | | 48.0 | | 52.7 | | 47.6 | | 46.7 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.644 | | 0.411 | | 0.732 | | 0.554 | | 0.577 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.774 | | 0.704 | | 0.774 | | 0.733 | | 0.716 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.621 | | 0.686 | | 0.502 | | 0.617 | | 0.588 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.763 | | 0.792 | | 0.742 | | 0.737 | | 0.751 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.785 | | 0.800 | | 0.835 | | 0.782 | | 0.760 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 57.8 | | 53.2 | | 57.3 | | 54.7 | | 53.7 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.825 | | 0.813 | | 0.862 | | 0.823 | | 0.823 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.849 | | 0.714 | | 0.784 | | 0.840 | | 0.815 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.831 | | 0.833 | | 0.859 | | 0.830 | | 0.794 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.325 | | 0.429 | | 0.271 | | 0.198 | | 0.284 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.832 | | 0.784 | | 0.836 | | 0.791 | | 0.794 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 78.7 | | 71.4 | | 74.7 | | 71.8 | | 73.0 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.886 | | 0.871 | | 0.868 | | 0.832 | | 0.865 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.893 | | 0.851 | | 0.875 | | 0.871 | | 0.860 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.883 | | 0.811 | | 0.850 | | 0.839 | | 0.837 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 60.7 | | 54.9 | | 59.7 | | 60.0 | | 55.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.765 | | 0.792 | | 0.784 | | 0.815 | | 0.697 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.778 | | 0.687 | | 0.754 | | 0.769 | | 0.758 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.795 | | 0.740 | | 0.781 | | 0.738 | | 0.772 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 56.0 | | 49.0 | | 56.6 | | 56.3 | | 51.5 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.770 | | 0.723 | | 0.747 | | 0.811 | | 0.812 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.723 | | 0.622 | | 0.756 | | 0.674 | | 0.513 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.750 | | 0.749 | | 0.755 | | 0.759 | | 0.789 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.6:** PCA component loadings and explained variance for mobile phone use while driving: Europe IV.

| Construct | ESRA3 variable | Cross-national model | | Serbia | | Slovenia | | Spain | | Sweden | | Switzerland | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | | | | | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 54.9 | | 56.0 | | 64.4 | | 66.1 | | 61.2 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.859 | | 0.789 | | 0.847 | | 0.876 | | 0.807 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.390 | | 0.596 | | 0.675 | | 0.685 | | 0.691 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.870 | | 0.839 | | 0.871 | | 0.865 | | 0.842 | |
| **Socio-cognitive constructs** | | | | | | | | | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 48.3 | | 42.3 | | 56.5 | | 58.5 | | 50.2 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.540 | | 0.446 | | 0.759 | | 0.742 | | 0.686 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.734 | | 0.680 | | 0.795 | | 0.813 | | 0.710 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.663 | | 0.536 | | 0.596 | | 0.673 | | 0.695 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.752 | | 0.779 | | 0.793 | | 0.778 | | 0.712 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.760 | | 0.750 | | 0.797 | | 0.811 | | 0.738 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 49.9 | | 54.6 | | 56.9 | | 60.5 | | 55.9 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.849 | | 0.827 | | 0.795 | | 0.869 | | 0.807 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.800 | | 0.815 | | 0.838 | | 0.828 | | 0.806 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | | | | | | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.761 | | 0.802 | | 0.828 | | 0.841 | | 0.809 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.265 | | 0.309 | | 0.316 | | 0.400 | | 0.411 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.695 | | 0.802 | | 0.852 | | 0.845 | | 0.818 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 74.0 | | 73.9 | | 69.0 | | 76.9 | | 70.9 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.874 | | 0.904 | | 0.829 | | 0.898 | | 0.891 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.870 | | 0.872 | | 0.856 | | 0.880 | | 0.868 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.837 | | 0.801 | | 0.806 | | 0.854 | | 0.761 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | | z-score | | z-score | | z-score | | z-score | |
| **Social desirability** | | | | | | | | | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 53.4 | | 62.5 | | 62.6 | | 60.2 | | 67.7 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.772 | | 0.773 | | 0.787 | | 0.738 | | 0.809 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.702 | | 0.801 | | 0.800 | | 0.789 | | 0.836 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.716 | | 0.797 | | 0.786 | | 0.800 | | 0.822 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 51.8 | | 52.8 | | 54.8 | | 55.2 | | 55.6 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.737 | | 0.778 | | 0.799 | | 0.798 | | 0.772 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.726 | | 0.662 | | 0.708 | | 0.764 | | 0.766 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.696 | | 0.735 | | 0.711 | | 0.660 | | 0.696 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

**Table D.7:** PCA component loadings and explained variance for mobile phone use while driving: Europe V.

| Construct | ESRA3 variable | Cross-national model | | United Kingdom | |
|---|---|---|---|---|---|
| | | Loading | % variance | Loading | % variance |
| **Dependent variable** | | | | | |
| Self-reported mobile phone use1 | Over the last 30 days, how often did you as a CAR DRIVER ... | | 60.8 | | 61.0 |
| | – Talk on a hand-held mobile phone while driving? | 0.838 | | 0.826 | |
| | – Talk on a hands-free mobile phone while driving? | 0.625 | | 0.681 | |
| | – Read a message or check social media/news while driving? | 0.855 | | 0.827 | |
| **Socio-cognitive constructs** | | | | | |
| Attitude2, 3 | To what extent do you agree with each of the following statements? | | 50.3 | | 59.4 |
| | – For short trips, one can risk driving under the influence of alcohol. | 0.605 | | 0.765 | |
| | – I have to drive fast; otherwise, I have the impression of losing time. | 0.751 | | 0.802 | |
| | – Respecting speed limits is boring or dull. | 0.631 | | 0.665 | |
| | – I use a mobile phone while driving because I always want to be available. | 0.765 | | 0.766 | |
| | – To save time, I often use a mobile phone while driving. | 0.776 | | 0.844 | |
| Norms4 | Where you live, how acceptable would most other people say it is for a CAR DRIVER to ... | | 56.7 | | 61.7 |
| | – Talk on a hand-held mobile phone while driving? | 0.829 | | 0.849 | |
| | – Read a message or check social media/news while driving? | 0.811 | | 0.860 | |
| | How acceptable do you, personally, feel it is for a CAR DRIVER to ... | | | | |
| | – Talk on a hand-held mobile phone while driving? | 0.819 | | 0.813 | |
| | – Talk on a hands-free mobile phone while driving? | 0.410 | | 0.479 | |
| | – Read a message or check social media/news while driving? | 0.808 | | 0.856 | |
| PBC3 | To what extent do you agree with each of the following statements? | | 72.9 | | 70.1 |
| | – I trust myself when I check messages on my mobile phone while driving. | 0.872 | | 0.870 | |
| | – I have the ability to write a message on the mobile phone while driving. | 0.865 | | 0.885 | |
| | – I am able to talk on a hand-held mobile phone while driving. | 0.823 | | 0.749 | |
| Intention3 | To what extent do you agree with each of the following statements? | | n.a. | | n.a. |
| | – I intend not to use my mobile phone while driving in the next 30 days . | z-score | | z-score | |
| **Social desirability** | | | | | |
| SDR_PQ3 | To what extent do you agree with each of the following statements? | | 61.9 | | 72.2 |
| | – In an argument, I always remain objective and stick to the facts. | 0.784 | | 0.850 | |
| | – Even if I am feeling stressed, I am always friendly and polite to others. | 0.779 | | 0.839 | |
| | – When talking to someone, I always listen carefully to what the other person says. | 0.797 | | 0.860 | |
| SDR_NQ3, 5 | To what extent do you agree with each of the following statements? | | 54.5 | | 57.1 |
| | – It has happened that I have taken advantage of someone in the past. | 0.768 | | 0.693 | |
| | – I have occasionally thrown litter away in the countryside or onto the road. | 0.716 | | 0.795 | |
| | – Sometimes, I only help people if I expect to get something in return. | 0.732 | | 0.775 | |

*Note.* Loading = principal component loading; % variance = percentage of total variance explained by the retained component; PBC = perceived behavioural control; SDR_PQ = social desirability response tendency involving exaggeration of positive qualities; SDR_NQ = negative-quality component score oriented towards greater admission of negative qualities. Superscripts refer to the response-scale notes in the source table: 1 = a five-point scale from 1 (never) to 5 ((almost) always); 2 = the item set was expanded to other road-safety topics; 3 = a five-point scale from 1 (disagree) to 5 (agree); 4 = a five-point scale from 1 (unacceptable) to 5 (acceptable); 5 = the saved negative-quality component score is oriented towards agreement with the displayed statements.

# Appendix E

# Detailed weighted sample composition by country

**Table E.1:** Detailed weighted sample composition by country.

| Region | Country/model | Gender | | Age | | | Education | | Urbanisation | | Driving frequency | | | $n$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Male | Female | 18–34 | 35–54 | 55–74 | ≤ secondary | ≥ bachelor | Rural | Urban/ semi-urban | ≥4 days/week | 1–3 days/week | A few days/month | |
| Cross-national model | | 52.9% | 47.1% | 30.2% | 39.6% | 30.3% | 44.7% | 55.3% | 20.7% | 79.3% | 61.5% | 26.4% | 12.1% | 23669 |
| | Brazil | 53.7% | 46.3% | 43.8% | 39.3% | 16.9% | 27.5% | 72.5% | 2.3% | 97.7% | 62.1% | 22.7% | 15.2% | 666 |
| | Canada | 52.3% | 47.7% | 29.3% | 35.9% | 34.8% | 44.3% | 55.7% | 13.3% | 86.7% | 60.7% | 27.4% | 12.0% | 1361 |
| Americas | Chile | 55.5% | 44.5% | 33.0% | 42.0% | 25.0% | 20.5% | 79.5% | 10.2% | 89.8% | 52.5% | 29.6% | 17.9% | 578 |
| | Mexico | 50.3% | 49.7% | 36.3% | 42.9% | 20.8% | 11.9% | 88.1% | 5.1% | 94.9% | 60.5% | 25.9% | 13.6% | 646 |
| | United States | 50.2% | 49.8% | 34.2% | 36.8% | 29.0% | 30.3% | 69.7% | 8.2% | 91.8% | 54.7% | 30.6% | 14.7% | 785 |
| | Australia | 50.8% | 49.2% | 34.4% | 38.3% | 27.3% | 37.7% | 62.3% | 8.4% | 91.6% | 56.6% | 31.5% | 11.9% | 809 |
| | Israel | 50.6% | 49.4% | 36.4% | 37.3% | 26.3% | 42.1% | 57.9% | 17.0% | 83.0% | 71.8% | 18.4% | 9.8% | 796 |
| Asia-Oceania | Japan | 56.1% | 43.9% | 18.2% | 41.6% | 40.2% | 38.0% | 62.0% | 12.3% | 87.7% | 59.3% | 31.6% | 9.1% | 570 |
| | Thailand | 51.2% | 48.8% | 35.6% | 46.5% | 17.9% | 24.3% | 75.7% | 19.3% | 80.7% | 54.3% | 30.8% | 14.9% | 590 |
| | Türkiye | 51.7% | 48.3% | 42.6% | 40.9% | 16.5% | 18.4% | 81.6% | 1.0% | 99.0% | 55.8% | 31.0% | 13.2% | 700 |
| | Austria | 52.6% | 47.4% | 27.8% | 40.5% | 31.6% | 75.9% | 24.1% | 41.7% | 58.3% | 59.9% | 26.1% | 14.0% | 1421 |
| | Belgium | 51.6% | 48.4% | 28.5% | 37.6% | 33.9% | 44.6% | 55.4% | 42.9% | 57.1% | 60.2% | 28.4% | 11.4% | 1346 |
| | Bosnia and Herzegovina | 55.1% | 44.9% | 34.3% | 40.8% | 24.9% | 46.5% | 53.5% | 15.4% | 84.6% | 78.0% | 11.7% | 10.3% | 605 |
| | Czech Republic | 55.4% | 44.6% | 28.0% | 44.4% | 27.6% | 64.3% | 35.7% | 28.6% | 71.4% | 56.4% | 28.5% | 15.1% | 598 |
| | Denmark | 54.9% | 45.1% | 30.7% | 35.2% | 34.1% | 56.4% | 43.6% | 21.8% | 78.2% | 62.1% | 27.8% | 10.0% | 647 |
| | Finland | 55.6% | 44.4% | 29.3% | 36.4% | 34.3% | 54.9% | 45.1% | 15.1% | 84.9% | 55.0% | 30.6% | 14.4% | 677 |
| | France | 52.6% | 47.4% | 27.4% | 38.4% | 34.2% | 53.6% | 46.4% | 27.6% | 72.4% | 59.7% | 28.5% | 11.8% | 772 |
| | Germany | 52.4% | 47.6% | 28.3% | 39.6% | 32.0% | 58.7% | 41.3% | 23.5% | 76.5% | 54.7% | 34.6% | 10.7% | 616 |
| | Greece | 54.5% | 45.5% | 23.9% | 41.6% | 34.5% | 32.4% | 67.6% | 7.8% | 92.2% | 73.2% | 15.1% | 11.7% | 753 |
| | Ireland | 49.4% | 50.6% | 27.7% | 41.6% | 30.8% | 36.5% | 63.5% | 35.0% | 65.0% | 69.4% | 22.5% | 8.1% | 708 |
| Europe | Italy | 50.9% | 49.1% | 24.4% | 41.1% | 34.5% | 61.4% | 38.6% | 14.9% | 85.1% | 70.8% | 21.5% | 7.6% | 908 |
| | Latvia | 55.5% | 44.5% | 30.2% | 40.2% | 29.6% | 37.2% | 62.8% | 24.6% | 75.4% | 73.1% | 16.9% | 10.0% | 622 |
| | Netherlands | 53.4% | 46.6% | 30.9% | 35.5% | 33.6% | 49.8% | 50.2% | 37.9% | 62.1% | 49.2% | 37.1% | 13.7% | 696 |
| | Poland | 52.8% | 47.2% | 30.6% | 38.9% | 30.5% | 50.0% | 50.0% | 18.1% | 81.9% | 61.1% | 23.7% | 15.2% | 725 |
| | Portugal | 50.0% | 50.0% | 24.4% | 41.2% | 34.4% | 42.1% | 57.9% | 12.2% | 87.8% | 71.3% | 20.3% | 8.4% | 847 |
| | Serbia | 58.6% | 41.4% | 28.3% | 40.4% | 31.4% | 42.7% | 57.3% | 12.1% | 87.9% | 68.2% | 19.8% | 12.0% | 676 |
| | Slovenia | 53.1% | 46.9% | 24.8% | 41.5% | 33.7% | 53.3% | 46.7% | 41.3% | 58.7% | 73.3% | 18.8% | 8.0% | 805 |
| | Spain | 52.6% | 47.4% | 22.7% | 46.9% | 30.4% | 39.2% | 60.8% | 14.1% | 85.9% | 57.2% | 29.8% | 13.0% | 704 |
| | Sweden | 54.8% | 45.2% | 33.4% | 34.5% | 32.1% | 53.9% | 46.1% | 19.0% | 81.0% | 50.2% | 34.0% | 15.8% | 630 |
| | Switzerland | 54.6% | 45.4% | 30.8% | 37.8% | 31.4% | 54.1% | 45.9% | 36.5% | 63.5% | 52.0% | 33.8% | 14.2% | 775 |
| | United Kingdom | 53.4% | 46.6% | 33.5% | 37.9% | 28.7% | 42.2% | 57.8% | 18.4% | 81.6% | 57.3% | 32.7% | 10.0% | 637 |

*Note.* Percentages are weighted within country; sample sizes are unweighted counts of regular car drivers included in the analytical sample.

# Appendix F

# Regression parameter estimates by country

The notation follows Chapter 3: $\widehat{\beta}$ denotes an estimated unstandardised regression coefficient and $\widehat{\beta}^*$ an estimated standardised coefficient. Confidence intervals refer to the unstandardised estimates. SDR_NQ is oriented towards greater admission of negative qualities, as explained in Section 3.3.1.

**Table F.1:** Linear regression parameter estimates: Cross-national model.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.037 | [0.004, 0.070] | 0.026 | | -0.178 | [-0.211, -0.146] | $< 0.001$ | | -0.148 | [-0.179, -0.118] | $< 0.001$ |
| Male | -0.001 | -0.001 | [-0.019, 0.017] | 0.907 | -0.008 | -0.016 | [-0.034, 0.002] | 0.076 | 0.007 | 0.013 | [-0.004, 0.030] | 0.133 |
| Age 18–34 years | -0.009 | -0.020 | [-0.044, 0.004] | 0.097 | 0.040 | 0.087 | [0.063, 0.111] | $< 0.001$ | -0.016 | -0.035 | [-0.057, -0.013] | 0.002 |
| Age 35–54 years | -0.003 | -0.007 | [-0.029, 0.015] | 0.555 | 0.043 | 0.089 | [0.067, 0.111] | $< 0.001$ | -0.006 | -0.012 | [-0.033, 0.008] | 0.234 |
| Secondary education or lower | -0.021 | -0.041 | [-0.060, -0.023] | $< 0.001$ | -0.013 | -0.027 | [-0.045, -0.008] | 0.004 | 0.011 | 0.021 | [0.004, 0.038] | 0.014 |
| Rural residence | -0.005 | -0.013 | [-0.035, 0.010] | 0.271 | -0.002 | -0.006 | [-0.028, 0.016] | 0.610 | 0.007 | 0.018 | [-0.003, 0.039] | 0.091 |
| Drives 1–3 days per week | 0.011 | 0.026 | [-0.006, 0.057] | 0.110 | 0.032 | 0.072 | [0.042, 0.103] | $< 0.001$ | 0.037 | 0.085 | [0.056, 0.113] | $< 0.001$ |
| Drives at least 4 days per week | -0.011 | -0.023 | [-0.051, 0.006] | 0.121 | 0.094 | 0.194 | [0.166, 0.222] | $< 0.001$ | 0.096 | 0.196 | [0.170, 0.223] | $< 0.001$ |
| Attitudes | 0.157 | 0.157 | [0.145, 0.168] | $< 0.001$ | 0.234 | 0.234 | [0.222, 0.247] | $< 0.001$ | 0.185 | 0.185 | [0.174, 0.196] | $< 0.001$ |
| Norms | 0.438 | 0.438 | [0.427, 0.448] | $< 0.001$ | 0.288 | 0.288 | [0.277, 0.299] | $< 0.001$ | 0.458 | 0.458 | [0.447, 0.468] | $< 0.001$ |
| Perceived behavioural control | 0.215 | 0.215 | [0.204, 0.227] | $< 0.001$ | 0.287 | 0.287 | [0.274, 0.299] | $< 0.001$ | 0.177 | 0.177 | [0.166, 0.188] | $< 0.001$ |
| Intention | -0.064 | -0.064 | [-0.073, -0.055] | $< 0.001$ | -0.050 | -0.050 | [-0.059, -0.041] | $< 0.001$ | -0.087 | -0.087 | [-0.096, -0.078] | $< 0.001$ |
| SDR_PQ | 0.024 | 0.024 | [0.015, 0.033] | $< 0.001$ | 0.013 | 0.013 | [0.004, 0.022] | 0.005 | -0.030 | -0.030 | [-0.039, -0.022] | $< 0.001$ |
| SDR_NQ | 0.078 | 0.078 | [0.068, 0.088] | $< 0.001$ | 0.026 | 0.026 | [0.016, 0.036] | $< 0.001$ | 0.050 | 0.050 | [0.040, 0.059] | $< 0.001$ |
| Model $R^2$ | 0.502 | | | | 0.518 | | | | 0.579 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.2:** Linear regression parameter estimates: Brazil.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.087 | [-0.092, 0.266] | 0.342 | | -0.175 | [-0.381, 0.032] | 0.098 | | 0.035 | [-0.163, 0.234] | 0.726 |
| Male | -0.053 | -0.107 | [-0.205, -0.009] | 0.033 | -0.001 | -0.002 | [-0.115, 0.112] | 0.979 | 0.039 | 0.078 | [-0.032, 0.188] | 0.163 |
| Age 18–34 years | -0.016 | -0.032 | [-0.173, 0.108] | 0.651 | 0.023 | 0.047 | [-0.116, 0.209] | 0.574 | -0.017 | -0.033 | [-0.189, 0.122] | 0.673 |
| Age 35–54 years | -0.009 | -0.019 | [-0.162, 0.124] | 0.795 | 0.048 | 0.097 | [-0.067, 0.262] | 0.246 | 0.004 | 0.008 | [-0.148, 0.164] | 0.920 |
| Secondary education or lower | -0.036 | -0.080 | [-0.192, 0.032] | 0.163 | -0.027 | -0.060 | [-0.189, 0.069] | 0.359 | -0.067 | -0.149 | [-0.273, -0.026] | 0.018 |
| Rural residence | 0.038 | 0.256 | [-0.074, 0.585] | 0.129 | 0.027 | 0.184 | [-0.194, 0.562] | 0.340 | 0.060 | 0.407 | [0.043, 0.772] | 0.028 |
| Drives 1–3 days per week | 0.003 | 0.006 | [-0.158, 0.170] | 0.942 | 0.066 | 0.157 | [-0.031, 0.346] | 0.102 | -0.009 | -0.022 | [-0.202, 0.159] | 0.813 |
| Drives at least 4 days per week | 0.006 | 0.012 | [-0.132, 0.156] | 0.872 | 0.073 | 0.151 | [-0.016, 0.317] | 0.076 | -0.023 | -0.047 | [-0.206, 0.112] | 0.563 |
| Attitudes | 0.181 | 0.181 | [0.114, 0.249] | $< 0.001$ | 0.078 | 0.078 | [-0.002, 0.158] | 0.057 | 0.222 | 0.222 | [0.149, 0.295] | $< 0.001$ |
| Norms | 0.466 | 0.466 | [0.408, 0.524] | $< 0.001$ | 0.325 | 0.325 | [0.257, 0.392] | $< 0.001$ | 0.390 | 0.390 | [0.326, 0.454] | $< 0.001$ |
| Perceived behavioural control | 0.225 | 0.225 | [0.158, 0.291] | $< 0.001$ | 0.365 | 0.365 | [0.285, 0.445] | $< 0.001$ | 0.177 | 0.177 | [0.104, 0.250] | $< 0.001$ |
| Intention | -0.069 | -0.069 | [-0.118, -0.020] | 0.006 | -0.035 | -0.035 | [-0.092, 0.022] | 0.229 | -0.041 | -0.041 | [-0.095, 0.013] | 0.138 |
| SDR_PQ | 0.018 | 0.018 | [-0.031, 0.068] | 0.463 | -0.024 | -0.024 | [-0.081, 0.032] | 0.400 | -0.044 | -0.044 | [-0.099, 0.010] | 0.111 |
| SDR_NQ | 0.099 | 0.099 | [0.046, 0.153] | $< 0.001$ | 0.042 | 0.042 | [-0.019, 0.103] | 0.178 | 0.100 | 0.100 | [0.041, 0.158] | 0.001 |
| Model $R^2$ | 0.608 | | | | 0.480 | | | | 0.525 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.3:** Linear regression parameter estimates: Canada.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.113 | [-0.003, 0.229] | 0.057 | | -0.114 | [-0.235, 0.007] | 0.065 | | 0.005 | [-0.108, 0.119] | 0.926 |
| Male | -0.015 | -0.030 | [-0.096, 0.036] | 0.372 | -0.044 | -0.088 | [-0.156, -0.019] | 0.012 | -0.036 | -0.073 | [-0.138, -0.007] | 0.029 |
| Age 18–34 years | -0.006 | -0.014 | [-0.098, 0.071] | 0.752 | 0.028 | 0.062 | [-0.027, 0.151] | 0.174 | -0.068 | -0.150 | [-0.233, -0.068] | $< 0.001$ |
| Age 35–54 years | 0.000 | 0.001 | [-0.077, 0.078] | 0.986 | 0.042 | 0.088 | [0.007, 0.168] | 0.033 | -0.045 | -0.094 | [-0.169, -0.019] | 0.015 |
| Secondary education or lower | -0.023 | -0.045 | [-0.111, 0.020] | 0.173 | -0.004 | -0.007 | [-0.075, 0.061] | 0.838 | 0.012 | 0.025 | [-0.039, 0.089] | 0.449 |
| Rural residence | -0.011 | -0.032 | [-0.127, 0.063] | 0.503 | 0.022 | 0.065 | [-0.033, 0.164] | 0.192 | -0.001 | -0.003 | [-0.096, 0.089] | 0.944 |
| Drives 1–3 days per week | -0.019 | -0.044 | [-0.154, 0.067] | 0.441 | 0.016 | 0.036 | [-0.079, 0.152] | 0.539 | 0.011 | 0.025 | [-0.083, 0.133] | 0.650 |
| Drives at least 4 days per week | -0.048 | -0.098 | [-0.201, 0.005] | 0.062 | 0.077 | 0.157 | [0.049, 0.264] | 0.004 | 0.073 | 0.150 | [0.050, 0.250] | 0.003 |
| Attitudes | 0.146 | 0.146 | [0.101, 0.192] | $< 0.001$ | 0.176 | 0.176 | [0.124, 0.229] | $< 0.001$ | 0.115 | 0.115 | [0.072, 0.158] | $< 0.001$ |
| Norms | 0.496 | 0.496 | [0.456, 0.537] | $< 0.001$ | 0.394 | 0.394 | [0.350, 0.439] | $< 0.001$ | 0.572 | 0.572 | [0.531, 0.613] | $< 0.001$ |
| Perceived behavioural control | 0.274 | 0.274 | [0.229, 0.318] | $< 0.001$ | 0.295 | 0.295 | [0.242, 0.348] | $< 0.001$ | 0.193 | 0.193 | [0.151, 0.236] | $< 0.001$ |
| Intention | -0.065 | -0.063 | [-0.095, -0.031] | $< 0.001$ | -0.001 | -0.001 | [-0.034, 0.033] | 0.972 | -0.109 | -0.107 | [-0.139, -0.075] | $< 0.001$ |
| SDR_PQ | 0.029 | 0.029 | [-0.004, 0.062] | 0.084 | -0.032 | -0.032 | [-0.067, 0.003] | 0.070 | -0.021 | -0.021 | [-0.054, 0.012] | 0.215 |
| SDR_NQ | 0.037 | 0.037 | [-0.002, 0.075] | 0.060 | 0.033 | 0.033 | [-0.007, 0.072] | 0.102 | 0.029 | 0.029 | [-0.008, 0.066] | 0.121 |
| Model $R^2$ | 0.650 | | | | 0.621 | | | | 0.668 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.4:** Linear regression parameter estimates: Chile.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.015 | [-0.179, 0.148] | 0.853 | | -0.106 | [-0.313, 0.100] | 0.312 | | -0.200 | [-0.399, -0.001] | 0.049 |
| Male | 0.017 | 0.034 | [-0.069, 0.136] | 0.518 | -0.019 | -0.038 | [-0.168, 0.091] | 0.563 | 0.015 | 0.030 | [-0.094, 0.155] | 0.632 |
| Age 18–34 years | -0.037 | -0.078 | [-0.212, 0.056] | 0.252 | 0.009 | 0.020 | [-0.153, 0.193] | 0.821 | 0.010 | 0.020 | [-0.144, 0.184] | 0.808 |
| Age 35–54 years | -0.008 | -0.015 | [-0.144, 0.113] | 0.814 | 0.053 | 0.107 | [-0.055, 0.268] | 0.194 | 0.014 | 0.028 | [-0.127, 0.182] | 0.725 |
| Secondary education or lower | 0.006 | 0.014 | [-0.117, 0.144] | 0.837 | -0.037 | -0.091 | [-0.256, 0.073] | 0.276 | -0.066 | -0.164 | [-0.320, -0.007] | 0.040 |
| Rural residence | 0.047 | 0.156 | [-0.012, 0.324] | 0.069 | 0.062 | 0.206 | [-0.007, 0.418] | 0.057 | 0.004 | 0.013 | [-0.190, 0.217] | 0.897 |
| Drives 1–3 days per week | -0.026 | -0.057 | [-0.208, 0.095] | 0.462 | -0.012 | -0.026 | [-0.217, 0.165] | 0.788 | 0.057 | 0.125 | [-0.058, 0.308] | 0.181 |
| Drives at least 4 days per week | 0.026 | 0.052 | [-0.090, 0.194] | 0.475 | 0.078 | 0.156 | [-0.022, 0.334] | 0.086 | 0.152 | 0.305 | [0.133, 0.476] | 0.001 |
| Attitudes | 0.214 | 0.214 | [0.149, 0.279] | $< 0.001$ | 0.266 | 0.266 | [0.180, 0.353] | $< 0.001$ | 0.203 | 0.203 | [0.121, 0.285] | $< 0.001$ |
| Norms | 0.473 | 0.473 | [0.412, 0.533] | $< 0.001$ | 0.257 | 0.257 | [0.180, 0.334] | $< 0.001$ | 0.379 | 0.379 | [0.304, 0.453] | $< 0.001$ |
| Perceived behavioural control | 0.265 | 0.265 | [0.199, 0.332] | $< 0.001$ | 0.188 | 0.188 | [0.100, 0.277] | $< 0.001$ | 0.183 | 0.183 | [0.101, 0.264] | $< 0.001$ |
| Intention | -0.017 | -0.017 | [-0.068, 0.034] | 0.508 | -0.022 | -0.022 | [-0.087, 0.043] | 0.511 | -0.008 | -0.008 | [-0.070, 0.054] | 0.794 |
| SDR_PQ | 0.039 | 0.039 | [-0.012, 0.091] | 0.132 | 0.007 | 0.007 | [-0.058, 0.072] | 0.831 | -0.016 | -0.016 | [-0.078, 0.046] | 0.616 |
| SDR_NQ | 0.035 | 0.035 | [-0.020, 0.090] | 0.216 | 0.115 | 0.115 | [0.046, 0.184] | 0.001 | 0.063 | 0.063 | [-0.004, 0.129] | 0.065 |
| Model $R^2$ | 0.638 | | | | 0.425 | | | | 0.472 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.5:** Linear regression parameter estimates: Mexico.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.096 | [-0.306, 0.114] | 0.368 | | 0.109 | [-0.110, 0.327] | 0.329 | | -0.040 | [-0.245, 0.165] | 0.704 |
| Male | 0.077 | 0.153 | [0.033, 0.273] | 0.013 | -0.009 | -0.017 | [-0.142, 0.108] | 0.786 | 0.070 | 0.139 | [0.022, 0.257] | 0.020 |
| Age 18–34 years | -0.029 | -0.061 | [-0.222, 0.101] | 0.461 | -0.060 | -0.125 | [-0.293, 0.043] | 0.144 | -0.018 | -0.038 | [-0.197, 0.120] | 0.634 |
| Age 35–54 years | -0.009 | -0.018 | [-0.171, 0.135] | 0.819 | -0.040 | -0.082 | [-0.241, 0.078] | 0.315 | -0.021 | -0.043 | [-0.192, 0.107] | 0.575 |
| Secondary education or lower | 0.020 | 0.060 | [-0.120, 0.240] | 0.512 | -0.011 | -0.033 | [-0.220, 0.154] | 0.727 | -0.012 | -0.038 | [-0.212, 0.135] | 0.664 |
| Rural residence | 0.000 | -0.002 | [-0.271, 0.266] | 0.987 | -0.017 | -0.078 | [-0.356, 0.200] | 0.581 | 0.014 | 0.062 | [-0.196, 0.321] | 0.637 |
| Drives 1–3 days per week | -0.001 | -0.002 | [-0.194, 0.189] | 0.980 | -0.032 | -0.072 | [-0.271, 0.128] | 0.479 | 0.002 | 0.005 | [-0.181, 0.191] | 0.958 |
| Drives at least 4 days per week | 0.034 | 0.070 | [-0.107, 0.247] | 0.438 | 0.005 | 0.011 | [-0.173, 0.195] | 0.907 | 0.002 | 0.003 | [-0.168, 0.175] | 0.972 |
| Attitudes | 0.236 | 0.236 | [0.159, 0.313] | $< 0.001$ | 0.098 | 0.098 | [0.010, 0.185] | 0.028 | 0.216 | 0.216 | [0.143, 0.290] | $< 0.001$ |
| Norms | 0.309 | 0.309 | [0.247, 0.371] | $< 0.001$ | 0.251 | 0.251 | [0.183, 0.318] | $< 0.001$ | 0.326 | 0.326 | [0.263, 0.389] | $< 0.001$ |
| Perceived behavioural control | 0.217 | 0.217 | [0.144, 0.290] | $< 0.001$ | 0.371 | 0.371 | [0.288, 0.454] | $< 0.001$ | 0.226 | 0.226 | [0.156, 0.296] | $< 0.001$ |
| Intention | -0.064 | -0.064 | [-0.121, -0.007] | 0.028 | -0.063 | -0.062 | [-0.122, -0.003] | 0.040 | -0.054 | -0.054 | [-0.111, 0.002] | 0.060 |
| SDR_PQ | -0.025 | -0.025 | [-0.083, 0.033] | 0.397 | -0.005 | -0.005 | [-0.066, 0.055] | 0.864 | -0.070 | -0.070 | [-0.127, -0.013] | 0.015 |
| SDR_NQ | 0.134 | 0.134 | [0.068, 0.200] | $< 0.001$ | 0.124 | 0.124 | [0.056, 0.192] | $< 0.001$ | 0.124 | 0.124 | [0.061, 0.188] | $< 0.001$ |
| Model $R^2$ | 0.471 | | | | 0.430 | | | | 0.505 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.6:** Linear regression parameter estimates: United States.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.086 | [-0.230, 0.058] | 0.240 | | -0.110 | [-0.271, 0.051] | 0.180 | | -0.008 | [-0.147, 0.131] | 0.911 |
| Male | 0.054 | 0.107 | [0.025, 0.190] | 0.010 | 0.028 | 0.057 | [-0.034, 0.148] | 0.219 | 0.024 | 0.048 | [-0.033, 0.128] | 0.246 |
| Age 18–34 years | -0.037 | -0.078 | [-0.188, 0.032] | 0.166 | -0.055 | -0.115 | [-0.238, 0.007] | 0.066 | -0.136 | -0.286 | [-0.394, -0.179] | $< 0.001$ |
| Age 35–54 years | 0.040 | 0.082 | [-0.025, 0.189] | 0.133 | -0.002 | -0.004 | [-0.123, 0.115] | 0.949 | -0.083 | -0.172 | [-0.276, -0.068] | 0.001 |
| Secondary education or lower | 0.016 | 0.035 | [-0.060, 0.129] | 0.471 | 0.038 | 0.082 | [-0.023, 0.187] | 0.125 | 0.052 | 0.114 | [0.023, 0.206] | 0.015 |
| Rural residence | 0.004 | 0.013 | [-0.138, 0.164] | 0.863 | 0.029 | 0.105 | [-0.062, 0.273] | 0.218 | 0.031 | 0.113 | [-0.033, 0.259] | 0.129 |
| Drives 1–3 days per week | 0.035 | 0.077 | [-0.053, 0.207] | 0.247 | 0.036 | 0.078 | [-0.066, 0.222] | 0.287 | 0.027 | 0.059 | [-0.067, 0.186] | 0.356 |
| Drives at least 4 days per week | -0.006 | -0.011 | [-0.133, 0.110] | 0.853 | 0.059 | 0.119 | [-0.016, 0.254] | 0.084 | 0.076 | 0.153 | [0.034, 0.271] | 0.012 |
| Attitudes | 0.135 | 0.135 | [0.067, 0.203] | $< 0.001$ | 0.150 | 0.150 | [0.066, 0.234] | 0.001 | 0.204 | 0.204 | [0.139, 0.269] | $< 0.001$ |
| Norms | 0.480 | 0.480 | [0.427, 0.533] | $< 0.001$ | 0.394 | 0.394 | [0.337, 0.451] | $< 0.001$ | 0.430 | 0.430 | [0.380, 0.480] | $< 0.001$ |
| Perceived behavioural control | 0.241 | 0.241 | [0.178, 0.304] | $< 0.001$ | 0.308 | 0.308 | [0.223, 0.392] | $< 0.001$ | 0.213 | 0.213 | [0.148, 0.279] | $< 0.001$ |
| Intention | -0.040 | -0.040 | [-0.083, 0.003] | 0.065 | -0.035 | -0.035 | [-0.081, 0.011] | 0.139 | -0.074 | -0.075 | [-0.116, -0.033] | $< 0.001$ |
| SDR_PQ | 0.016 | 0.016 | [-0.026, 0.059] | 0.450 | 0.052 | 0.052 | [0.006, 0.099] | 0.028 | -0.006 | -0.006 | [-0.047, 0.036] | 0.793 |
| SDR_NQ | 0.090 | 0.090 | [0.042, 0.137] | $< 0.001$ | 0.023 | 0.023 | [-0.030, 0.075] | 0.396 | 0.084 | 0.084 | [0.038, 0.130] | $< 0.001$ |
| Model $R^2$ | 0.686 | | | | 0.615 | | | | 0.705 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.7:** Linear regression parameter estimates: Australia.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.007 | [-0.160, 0.174] | 0.935 | | -0.248 | [-0.430, -0.067] | 0.007 | | -0.063 | [-0.231, 0.106] | 0.466 |
| Male | 0.019 | 0.038 | [-0.050, 0.125] | 0.401 | -0.011 | -0.023 | [-0.117, 0.072] | 0.641 | 0.002 | 0.004 | [-0.083, 0.092] | 0.923 |
| Age 18–34 years | -0.036 | -0.077 | [-0.193, 0.040] | 0.197 | 0.067 | 0.140 | [0.013, 0.267] | 0.031 | -0.050 | -0.106 | [-0.222, 0.010] | 0.074 |
| Age 35–54 years | 0.037 | 0.076 | [-0.036, 0.188] | 0.183 | 0.086 | 0.178 | [0.056, 0.299] | 0.004 | 0.018 | 0.036 | [-0.076, 0.148] | 0.526 |
| Secondary education or lower | 0.003 | 0.007 | [-0.088, 0.101] | 0.887 | 0.057 | 0.117 | [0.015, 0.220] | 0.025 | 0.080 | 0.164 | [0.069, 0.259] | 0.001 |
| Rural residence | 0.022 | 0.081 | [-0.075, 0.236] | 0.309 | 0.003 | 0.009 | [-0.159, 0.178] | 0.912 | -0.025 | -0.088 | [-0.244, 0.067] | 0.264 |
| Drives 1–3 days per week | 0.003 | 0.005 | [-0.141, 0.152] | 0.942 | 0.022 | 0.047 | [-0.111, 0.206] | 0.556 | -0.018 | -0.038 | [-0.185, 0.109] | 0.611 |
| Drives at least 4 days per week | -0.035 | -0.071 | [-0.211, 0.070] | 0.325 | 0.073 | 0.147 | [-0.005, 0.300] | 0.058 | 0.035 | 0.071 | [-0.072, 0.215] | 0.328 |
| Attitudes | 0.293 | 0.293 | [0.226, 0.359] | $< 0.001$ | 0.212 | 0.212 | [0.140, 0.285] | $< 0.001$ | 0.282 | 0.282 | [0.219, 0.345] | $< 0.001$ |
| Norms | 0.424 | 0.424 | [0.371, 0.477] | $< 0.001$ | 0.333 | 0.333 | [0.275, 0.391] | $< 0.001$ | 0.435 | 0.435 | [0.378, 0.492] | $< 0.001$ |
| Perceived behavioural control | 0.209 | 0.209 | [0.147, 0.270] | $< 0.001$ | 0.304 | 0.304 | [0.231, 0.377] | $< 0.001$ | 0.142 | 0.142 | [0.083, 0.202] | $< 0.001$ |
| Intention | -0.047 | -0.047 | [-0.092, -0.002] | 0.041 | -0.028 | -0.028 | [-0.077, 0.020] | 0.255 | -0.014 | -0.014 | [-0.061, 0.033] | 0.563 |
| SDR_PQ | -0.009 | -0.009 | [-0.053, 0.036] | 0.705 | -0.004 | -0.004 | [-0.051, 0.043] | 0.864 | -0.065 | -0.065 | [-0.109, -0.021] | 0.004 |
| SDR_NQ | -0.008 | -0.008 | [-0.054, 0.039] | 0.751 | -0.030 | -0.030 | [-0.081, 0.020] | 0.238 | 0.035 | 0.035 | [-0.012, 0.082] | 0.139 |
| Model $R^2$ | 0.629 | | | | 0.566 | | | | 0.629 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.8:** Linear regression parameter estimates: Israel.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.016 | [-0.223, 0.254] | 0.898 | | -0.417 | [-0.618, -0.216] | < 0.001 | | -0.552 | [-0.734, -0.371] | < 0.001 |
| Male | 0.000 | 0.001 | [-0.124, 0.125] | 0.994 | -0.010 | -0.021 | [-0.125, 0.083] | 0.695 | 0.002 | 0.003 | [-0.093, 0.099] | 0.947 |
| Age 18–34 years | -0.023 | -0.048 | [-0.214, 0.118] | 0.567 | 0.056 | 0.116 | [-0.024, 0.256] | 0.106 | 0.087 | 0.180 | [0.053, 0.306] | 0.005 |
| Age 35–54 years | -0.006 | -0.013 | [-0.171, 0.146] | 0.877 | 0.081 | 0.168 | [0.035, 0.301] | 0.014 | 0.071 | 0.146 | [0.026, 0.266] | 0.018 |
| Secondary education or lower | 0.058 | 0.118 | [-0.011, 0.246] | 0.073 | -0.012 | -0.025 | [-0.133, 0.083] | 0.647 | 0.006 | 0.012 | [-0.086, 0.110] | 0.816 |
| Rural residence | 0.041 | 0.108 | [-0.053, 0.270] | 0.188 | 0.024 | 0.064 | [-0.072, 0.199] | 0.356 | 0.028 | 0.073 | [-0.050, 0.197] | 0.242 |
| Drives 1–3 days per week | -0.035 | -0.090 | [-0.329, 0.149] | 0.459 | 0.068 | 0.175 | [-0.026, 0.376] | 0.088 | 0.108 | 0.279 | [0.097, 0.461] | 0.003 |
| Drives at least 4 days per week | -0.028 | -0.062 | [-0.271, 0.146] | 0.558 | 0.182 | 0.405 | [0.229, 0.580] | < 0.001 | 0.227 | 0.504 | [0.346, 0.663] | < 0.001 |
| Attitudes | 0.124 | 0.124 | [0.054, 0.195] | 0.001 | 0.239 | 0.239 | [0.172, 0.307] | < 0.001 | 0.185 | 0.185 | [0.126, 0.245] | < 0.001 |
| Norms | 0.185 | 0.185 | [0.120, 0.251] | < 0.001 | 0.189 | 0.189 | [0.132, 0.245] | < 0.001 | 0.423 | 0.423 | [0.367, 0.479] | < 0.001 |
| Perceived behavioural control | 0.281 | 0.281 | [0.214, 0.347] | < 0.001 | 0.365 | 0.365 | [0.300, 0.430] | < 0.001 | 0.167 | 0.167 | [0.107, 0.228] | < 0.001 |
| Intention | -0.146 | -0.146 | [-0.207, -0.085] | < 0.001 | -0.037 | -0.037 | [-0.092, 0.018] | 0.188 | -0.153 | -0.152 | [-0.202, -0.103] | < 0.001 |
| SDR_PQ | -0.035 | -0.035 | [-0.098, 0.027] | 0.269 | -0.024 | -0.024 | [-0.077, 0.029] | 0.373 | 0.015 | 0.015 | [-0.033, 0.063] | 0.542 |
| SDR_NQ | 0.089 | 0.089 | [0.022, 0.156] | 0.009 | 0.008 | 0.008 | [-0.048, 0.065] | 0.775 | 0.048 | 0.048 | [-0.004, 0.100] | 0.069 |
| Model $R^2$ | 0.265 | | | | 0.484 | | | | 0.574 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.9:** Linear regression parameter estimates: Japan.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.075 | [-0.193, 0.342] | 0.583 | | -0.191 | [-0.441, 0.059] | 0.135 | | -0.104 | [-0.316, 0.109] | 0.339 |
| Male | 0.014 | 0.028 | [-0.111, 0.167] | 0.696 | 0.089 | 0.179 | [0.048, 0.311] | 0.008 | 0.121 | 0.243 | [0.131, 0.356] | $< 0.001$ |
| Age 18–34 years | 0.060 | 0.155 | [-0.040, 0.351] | 0.119 | -0.047 | -0.122 | [-0.306, 0.063] | 0.195 | -0.144 | -0.374 | [-0.529, -0.219] | $< 0.001$ |
| Age 35–54 years | -0.029 | -0.059 | [-0.210, 0.091] | 0.439 | -0.006 | -0.012 | [-0.154, 0.130] | 0.869 | -0.048 | -0.098 | [-0.218, 0.022] | 0.110 |
| Secondary education or lower | 0.005 | 0.010 | [-0.130, 0.149] | 0.889 | 0.007 | 0.015 | [-0.116, 0.146] | 0.823 | -0.020 | -0.041 | [-0.152, 0.070] | 0.466 |
| Rural residence | 0.018 | 0.055 | [-0.154, 0.264] | 0.606 | 0.022 | 0.066 | [-0.130, 0.262] | 0.506 | 0.057 | 0.174 | [0.008, 0.340] | 0.039 |
| Drives 1–3 days per week | -0.006 | -0.014 | [-0.269, 0.242] | 0.917 | 0.023 | 0.050 | [-0.189, 0.290] | 0.682 | 0.025 | 0.053 | [-0.151, 0.257] | 0.611 |
| Drives at least 4 days per week | -0.083 | -0.169 | [-0.413, 0.075] | 0.174 | 0.073 | 0.148 | [-0.081, 0.377] | 0.204 | 0.045 | 0.091 | [-0.103, 0.285] | 0.355 |
| Attitudes | 0.124 | 0.124 | [0.034, 0.215] | 0.007 | 0.211 | 0.211 | [0.116, 0.306] | $< 0.001$ | 0.089 | 0.089 | [0.015, 0.164] | 0.018 |
| Norms | 0.355 | 0.355 | [0.276, 0.434] | $< 0.001$ | 0.415 | 0.415 | [0.334, 0.497] | $< 0.001$ | 0.552 | 0.552 | [0.485, 0.618] | $< 0.001$ |
| Perceived behavioural control | 0.215 | 0.215 | [0.129, 0.302] | $< 0.001$ | 0.081 | 0.081 | [-0.006, 0.169] | 0.069 | 0.101 | 0.101 | [0.032, 0.170] | 0.004 |
| Intention | -0.050 | -0.050 | [-0.118, 0.019] | 0.155 | -0.104 | -0.104 | [-0.169, -0.039] | 0.002 | -0.131 | -0.131 | [-0.188, -0.074] | $< 0.001$ |
| SDR_PQ | 0.015 | 0.015 | [-0.054, 0.084] | 0.665 | -0.010 | -0.010 | [-0.075, 0.055] | 0.764 | -0.062 | -0.062 | [-0.117, -0.007] | 0.028 |
| SDR_NQ | 0.022 | 0.022 | [-0.051, 0.096] | 0.552 | -0.004 | -0.004 | [-0.074, 0.066] | 0.911 | 0.030 | 0.030 | [-0.028, 0.089] | 0.308 |
| Model $R^2$ | 0.350 | | | | 0.427 | | | | 0.589 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.10:** Linear regression parameter estimates: Thailand.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.048 | [-0.246, 0.149] | 0.629 | | -0.322 | [-0.520, -0.125] | 0.001 | | -0.075 | [-0.274, 0.125] | 0.463 |
| Male | -0.017 | -0.033 | [-0.143, 0.077] | 0.552 | -0.004 | -0.007 | [-0.118, 0.103] | 0.896 | 0.005 | 0.011 | [-0.101, 0.122] | 0.851 |
| Age 18–34 years | -0.003 | -0.007 | [-0.166, 0.153] | 0.935 | 0.098 | 0.205 | [0.044, 0.365] | 0.013 | 0.030 | 0.063 | [-0.099, 0.224] | 0.448 |
| Age 35–54 years | 0.000 | 0.000 | [-0.150, 0.150] | 0.997 | 0.099 | 0.198 | [0.046, 0.349] | 0.011 | 0.008 | 0.017 | [-0.135, 0.169] | 0.827 |
| Secondary education or lower | -0.010 | -0.024 | [-0.156, 0.108] | 0.725 | 0.008 | 0.018 | [-0.115, 0.151] | 0.794 | 0.014 | 0.032 | [-0.103, 0.167] | 0.643 |
| Rural residence | 0.052 | 0.130 | [-0.014, 0.275] | 0.076 | -0.040 | -0.101 | [-0.246, 0.044] | 0.174 | 0.019 | 0.047 | [-0.099, 0.194] | 0.528 |
| Drives 1–3 days per week | 0.050 | 0.107 | [-0.062, 0.277] | 0.214 | 0.071 | 0.153 | [-0.018, 0.324] | 0.080 | 0.014 | 0.031 | [-0.142, 0.203] | 0.727 |
| Drives at least 4 days per week | 0.014 | 0.029 | [-0.130, 0.187] | 0.721 | 0.119 | 0.238 | [0.079, 0.398] | 0.003 | 0.012 | 0.024 | [-0.137, 0.186] | 0.769 |
| Attitudes | 0.092 | 0.092 | [0.009, 0.175] | 0.030 | 0.196 | 0.196 | [0.115, 0.277] | $< 0.001$ | 0.244 | 0.244 | [0.153, 0.335] | $< 0.001$ |
| Norms | 0.450 | 0.450 | [0.385, 0.514] | $< 0.001$ | 0.382 | 0.382 | [0.313, 0.450] | $< 0.001$ | 0.388 | 0.388 | [0.322, 0.454] | $< 0.001$ |
| Perceived behavioural control | 0.324 | 0.324 | [0.247, 0.401] | $< 0.001$ | 0.289 | 0.289 | [0.207, 0.372] | $< 0.001$ | 0.221 | 0.221 | [0.129, 0.312] | $< 0.001$ |
| Intention | 0.019 | 0.019 | [-0.037, 0.074] | 0.506 | 0.014 | 0.014 | [-0.041, 0.070] | 0.616 | 0.021 | 0.021 | [-0.036, 0.078] | 0.469 |
| SDR_PQ | 0.017 | 0.017 | [-0.039, 0.073] | 0.546 | 0.063 | 0.063 | [0.006, 0.119] | 0.029 | -0.017 | -0.017 | [-0.074, 0.040] | 0.562 |
| SDR_NQ | 0.074 | 0.074 | [0.016, 0.133] | 0.013 | -0.023 | -0.023 | [-0.081, 0.036] | 0.450 | 0.041 | 0.041 | [-0.019, 0.101] | 0.177 |
| Model $R^2$ | | 0.579 | | | | 0.572 | | | | 0.565 | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.11:** Linear regression parameter estimates: Türkiye.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.020 | [-0.217, 0.177] | 0.843 | | 0.065 | [-0.137, 0.267] | 0.528 | | -0.035 | [-0.226, 0.156] | 0.718 |
| Male | -0.006 | -0.012 | [-0.115, 0.092] | 0.826 | 0.044 | 0.088 | [-0.018, 0.195] | 0.103 | 0.069 | 0.137 | [0.037, 0.238] | 0.007 |
| Age 18–34 years | -0.037 | -0.075 | [-0.226, 0.077] | 0.333 | -0.073 | -0.147 | [-0.302, 0.007] | 0.062 | -0.046 | -0.092 | [-0.239, 0.054] | 0.215 |
| Age 35–54 years | -0.041 | -0.084 | [-0.234, 0.067] | 0.277 | -0.046 | -0.094 | [-0.248, 0.061] | 0.234 | -0.042 | -0.085 | [-0.231, 0.060] | 0.251 |
| Secondary education or lower | -0.009 | -0.022 | [-0.157, 0.113] | 0.748 | -0.050 | -0.130 | [-0.269, 0.010] | 0.068 | -0.057 | -0.146 | [-0.278, -0.015] | 0.029 |
| Rural residence | -0.011 | -0.113 | [-0.630, 0.405] | 0.670 | -0.017 | -0.176 | [-0.709, 0.356] | 0.515 | -0.001 | -0.009 | [-0.512, 0.494] | 0.972 |
| Drives 1–3 days per week | 0.078 | 0.169 | [0.001, 0.338] | 0.049 | 0.019 | 0.042 | [-0.132, 0.215] | 0.638 | 0.045 | 0.096 | [-0.067, 0.260] | 0.249 |
| Drives at least 4 days per week | 0.040 | 0.080 | [-0.079, 0.238] | 0.325 | 0.003 | 0.006 | [-0.157, 0.169] | 0.945 | 0.032 | 0.064 | [-0.090, 0.218] | 0.417 |
| Attitudes | 0.145 | 0.145 | [0.080, 0.210] | $< 0.001$ | 0.260 | 0.260 | [0.183, 0.338] | $< 0.001$ | 0.171 | 0.171 | [0.100, 0.241] | $< 0.001$ |
| Norms | 0.578 | 0.578 | [0.522, 0.633] | $< 0.001$ | 0.392 | 0.392 | [0.331, 0.454] | $< 0.001$ | 0.553 | 0.553 | [0.495, 0.611] | $< 0.001$ |
| Perceived behavioural control | 0.149 | 0.149 | [0.086, 0.212] | $< 0.001$ | 0.181 | 0.181 | [0.106, 0.256] | $< 0.001$ | 0.122 | 0.122 | [0.053, 0.190] | $< 0.001$ |
| Intention | -0.026 | -0.026 | [-0.078, 0.026] | 0.329 | 0.004 | 0.004 | [-0.049, 0.057] | 0.877 | -0.042 | -0.042 | [-0.094, 0.009] | 0.107 |
| SDR_PQ | -0.006 | -0.006 | [-0.059, 0.047] | 0.825 | -0.026 | -0.026 | [-0.081, 0.028] | 0.342 | -0.013 | -0.013 | [-0.064, 0.039] | 0.636 |
| SDR_NQ | 0.039 | 0.039 | [-0.017, 0.095] | 0.170 | 0.034 | 0.034 | [-0.024, 0.091] | 0.247 | 0.022 | 0.022 | [-0.033, 0.077] | 0.434 |
| Model $R^2$ | | 0.543 | | | | 0.517 | | | | 0.569 | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.12:** Linear regression parameter estimates: Austria.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.099 | [-0.258, 0.061] | 0.225 | | -0.247 | [-0.390, -0.104] | 0.001 | | -0.104 | [-0.236, 0.027] | 0.120 |
| Male | 0.036 | 0.072 | [-0.014, 0.159] | 0.100 | -0.009 | -0.019 | [-0.095, 0.058] | 0.634 | -0.043 | -0.086 | [-0.158, -0.014] | 0.020 |
| Age 18–34 years | 0.049 | 0.109 | [-0.004, 0.221] | 0.058 | 0.061 | 0.136 | [0.032, 0.240] | 0.011 | 0.022 | 0.049 | [-0.045, 0.143] | 0.306 |
| Age 35–54 years | 0.009 | 0.019 | [-0.083, 0.121] | 0.711 | 0.009 | 0.018 | [-0.074, 0.110] | 0.703 | -0.017 | -0.036 | [-0.119, 0.048] | 0.405 |
| Secondary education or lower | 0.003 | 0.008 | [-0.092, 0.107] | 0.881 | 0.016 | 0.037 | [-0.052, 0.126] | 0.413 | 0.014 | 0.032 | [-0.049, 0.114] | 0.439 |
| Rural residence | 0.059 | 0.119 | [0.032, 0.206] | 0.007 | -0.005 | -0.011 | [-0.089, 0.067] | 0.784 | 0.004 | 0.007 | [-0.064, 0.079] | 0.844 |
| Drives 1–3 days per week | 0.016 | 0.036 | [-0.104, 0.175] | 0.618 | 0.071 | 0.161 | [0.036, 0.286] | 0.011 | 0.039 | 0.089 | [-0.026, 0.204] | 0.127 |
| Drives at least 4 days per week | -0.035 | -0.072 | [-0.200, 0.056] | 0.270 | 0.119 | 0.242 | [0.127, 0.357] | $< 0.001$ | 0.079 | 0.160 | [0.055, 0.266] | 0.003 |
| Attitudes | 0.180 | 0.180 | [0.129, 0.231] | $< 0.001$ | 0.237 | 0.237 | [0.188, 0.286] | $< 0.001$ | 0.185 | 0.185 | [0.140, 0.229] | $< 0.001$ |
| Norms | 0.288 | 0.288 | [0.242, 0.334] | $< 0.001$ | 0.215 | 0.215 | [0.171, 0.259] | $< 0.001$ | 0.391 | 0.391 | [0.347, 0.435] | $< 0.001$ |
| Perceived behavioural control | 0.243 | 0.243 | [0.194, 0.291] | $< 0.001$ | 0.294 | 0.294 | [0.245, 0.343] | $< 0.001$ | 0.124 | 0.124 | [0.081, 0.167] | $< 0.001$ |
| Intention | -0.083 | -0.082 | [-0.125, -0.040] | $< 0.001$ | -0.117 | -0.117 | [-0.157, -0.077] | $< 0.001$ | -0.247 | -0.246 | [-0.284, -0.207] | $< 0.001$ |
| SDR_PQ | 0.023 | 0.023 | [-0.021, 0.068] | 0.306 | 0.013 | 0.013 | [-0.027, 0.052] | 0.533 | -0.015 | -0.015 | [-0.052, 0.022] | 0.414 |
| SDR_NQ | 0.063 | 0.063 | [0.016, 0.110] | 0.009 | 0.047 | 0.047 | [0.005, 0.090] | 0.029 | 0.048 | 0.048 | [0.009, 0.086] | 0.016 |
| Model $R^2$ | 0.358 | | | | 0.488 | | | | 0.567 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.13:** Linear regression parameter estimates: Belgium.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.105 | [-0.036, 0.246] | 0.144 | | -0.111 | [-0.242, 0.020] | 0.096 | | -0.159 | [-0.280, -0.038] | 0.010 |
| Male | -0.031 | -0.063 | [-0.140, 0.014] | 0.107 | -0.043 | -0.086 | [-0.156, -0.016] | 0.016 | -0.023 | -0.046 | [-0.113, 0.020] | 0.172 |
| Age 18–34 years | -0.069 | -0.153 | [-0.256, -0.051] | 0.003 | 0.042 | 0.094 | [-0.002, 0.191] | 0.056 | -0.014 | -0.032 | [-0.120, 0.057] | 0.482 |
| Age 35–54 years | 0.015 | 0.031 | [-0.060, 0.123] | 0.502 | 0.030 | 0.062 | [-0.024, 0.148] | 0.156 | 0.006 | 0.012 | [-0.067, 0.091] | 0.772 |
| Secondary education or lower | -0.037 | -0.073 | [-0.150, 0.003] | 0.060 | -0.012 | -0.024 | [-0.095, 0.047] | 0.509 | 0.037 | 0.075 | [0.009, 0.141] | 0.026 |
| Rural residence | 0.007 | 0.015 | [-0.062, 0.092] | 0.706 | -0.010 | -0.021 | [-0.092, 0.050] | 0.563 | 0.031 | 0.062 | [-0.004, 0.128] | 0.067 |
| Drives 1–3 days per week | 0.000 | 0.000 | [-0.132, 0.132] | 0.999 | 0.027 | 0.059 | [-0.062, 0.181] | 0.339 | 0.031 | 0.069 | [-0.044, 0.182] | 0.233 |
| Drives at least 4 days per week | -0.013 | -0.026 | [-0.148, 0.097] | 0.681 | 0.087 | 0.178 | [0.065, 0.292] | 0.002 | 0.086 | 0.176 | [0.071, 0.281] | 0.001 |
| Attitudes | 0.173 | 0.173 | [0.121, 0.226] | $< 0.001$ | 0.233 | 0.233 | [0.182, 0.285] | $< 0.001$ | 0.194 | 0.194 | [0.147, 0.241] | $< 0.001$ |
| Norms | 0.416 | 0.416 | [0.368, 0.463] | $< 0.001$ | 0.311 | 0.311 | [0.265, 0.356] | $< 0.001$ | 0.477 | 0.477 | [0.433, 0.521] | $< 0.001$ |
| Perceived behavioural control | 0.193 | 0.193 | [0.141, 0.244] | $< 0.001$ | 0.281 | 0.281 | [0.228, 0.334] | $< 0.001$ | 0.159 | 0.159 | [0.112, 0.206] | $< 0.001$ |
| Intention | -0.088 | -0.087 | [-0.127, -0.048] | $< 0.001$ | -0.052 | -0.052 | [-0.089, -0.014] | 0.007 | -0.122 | -0.121 | [-0.157, -0.085] | $< 0.001$ |
| SDR_PQ | 0.006 | 0.006 | [-0.032, 0.045] | 0.750 | 0.009 | 0.009 | [-0.027, 0.045] | 0.629 | 0.010 | 0.010 | [-0.025, 0.044] | 0.582 |
| SDR_NQ | 0.090 | 0.090 | [0.046, 0.133] | $< 0.001$ | 0.038 | 0.038 | [-0.002, 0.078] | 0.062 | 0.052 | 0.052 | [0.015, 0.088] | 0.006 |
| Model $R^2$ | 0.516 | | | | 0.588 | | | | 0.644 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.14:** Linear regression parameter estimates: Bosnia and Herzegovina.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.056 | [-0.313, 0.201] | 0.668 | | -0.183 | [-0.408, 0.041] | 0.109 | | -0.340 | [-0.554, -0.126] | 0.002 |
| Male | 0.068 | 0.136 | [-0.005, 0.277] | 0.059 | -0.032 | -0.064 | [-0.185, 0.056] | 0.294 | 0.056 | 0.112 | [-0.004, 0.228] | 0.059 |
| Age 18–34 years | 0.039 | 0.082 | [-0.100, 0.264] | 0.378 | 0.130 | 0.273 | [0.108, 0.438] | 0.001 | 0.156 | 0.328 | [0.173, 0.484] | $< 0.001$ |
| Age 35–54 years | -0.022 | -0.044 | [-0.218, 0.130] | 0.617 | 0.110 | 0.224 | [0.073, 0.376] | 0.004 | 0.093 | 0.189 | [0.044, 0.334] | 0.011 |
| Secondary education or lower | -0.010 | -0.021 | [-0.159, 0.118] | 0.771 | -0.036 | -0.073 | [-0.192, 0.047] | 0.232 | -0.021 | -0.043 | [-0.159, 0.073] | 0.472 |
| Rural residence | -0.049 | -0.135 | [-0.328, 0.058] | 0.170 | -0.003 | -0.009 | [-0.176, 0.157] | 0.913 | 0.055 | 0.152 | [-0.008, 0.313] | 0.063 |
| Drives 1–3 days per week | 0.037 | 0.113 | [-0.176, 0.402] | 0.441 | -0.059 | -0.184 | [-0.436, 0.068] | 0.152 | -0.024 | -0.076 | [-0.317, 0.165] | 0.537 |
| Drives at least 4 days per week | -0.006 | -0.016 | [-0.244, 0.213] | 0.893 | 0.048 | 0.115 | [-0.083, 0.313] | 0.254 | 0.050 | 0.119 | [-0.071, 0.309] | 0.218 |
| Attitudes | 0.029 | 0.029 | [-0.056, 0.113] | 0.503 | 0.204 | 0.204 | [0.127, 0.281] | $< 0.001$ | 0.054 | 0.054 | [-0.021, 0.129] | 0.158 |
| Norms | 0.275 | 0.275 | [0.199, 0.351] | $< 0.001$ | 0.113 | 0.113 | [0.040, 0.185] | 0.002 | 0.312 | 0.312 | [0.242, 0.382] | $< 0.001$ |
| Perceived behavioural control | 0.318 | 0.318 | [0.236, 0.400] | $< 0.001$ | 0.398 | 0.398 | [0.318, 0.479] | $< 0.001$ | 0.279 | 0.279 | [0.206, 0.351] | $< 0.001$ |
| Intention | -0.061 | -0.061 | [-0.129, 0.007] | 0.076 | -0.025 | -0.025 | [-0.084, 0.035] | 0.414 | -0.121 | -0.120 | [-0.179, -0.062] | $< 0.001$ |
| SDR_PQ | -0.042 | -0.042 | [-0.110, 0.027] | 0.237 | -0.030 | -0.030 | [-0.091, 0.030] | 0.326 | -0.103 | -0.103 | [-0.162, -0.044] | 0.001 |
| SDR_NQ | 0.037 | 0.037 | [-0.038, 0.112] | 0.330 | 0.038 | 0.038 | [-0.027, 0.103] | 0.248 | 0.107 | 0.107 | [0.045, 0.170] | 0.001 |
| Model $R^2$ | | 0.305 | | | | 0.479 | | | | 0.516 | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.15:** Linear regression parameter estimates: Czech Republic.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.026 | [-0.223, 0.172] | 0.799 | | -0.146 | [-0.339, 0.048] | 0.140 | | -0.259 | [-0.455, -0.063] | 0.010 |
| Male | -0.028 | -0.056 | [-0.174, 0.062] | 0.352 | -0.046 | -0.092 | [-0.206, 0.023] | 0.116 | 0.016 | 0.031 | [-0.085, 0.147] | 0.598 |
| Age 18–34 years | -0.047 | -0.105 | [-0.258, 0.049] | 0.180 | 0.043 | 0.097 | [-0.056, 0.250] | 0.214 | 0.032 | 0.071 | [-0.083, 0.225] | 0.368 |
| Age 35–54 years | 0.007 | 0.013 | [-0.123, 0.149] | 0.850 | 0.027 | 0.053 | [-0.080, 0.187] | 0.431 | 0.058 | 0.116 | [-0.018, 0.250] | 0.090 |
| Secondary education or lower | 0.047 | 0.099 | [-0.019, 0.216] | 0.100 | 0.025 | 0.053 | [-0.061, 0.166] | 0.364 | 0.006 | 0.012 | [-0.102, 0.127] | 0.833 |
| Rural residence | 0.015 | 0.034 | [-0.093, 0.160] | 0.602 | -0.001 | -0.001 | [-0.123, 0.121] | 0.986 | -0.005 | -0.011 | [-0.134, 0.113] | 0.866 |
| Drives 1–3 days per week | -0.013 | -0.029 | [-0.209, 0.151] | 0.751 | 0.023 | 0.050 | [-0.124, 0.224] | 0.573 | 0.051 | 0.113 | [-0.064, 0.289] | 0.210 |
| Drives at least 4 days per week | 0.013 | 0.027 | [-0.139, 0.193] | 0.749 | 0.086 | 0.173 | [0.012, 0.335] | 0.036 | 0.117 | 0.235 | [0.071, 0.400] | 0.005 |
| Attitudes | 0.087 | 0.087 | [0.020, 0.153] | 0.011 | 0.240 | 0.240 | [0.165, 0.314] | $< 0.001$ | 0.195 | 0.195 | [0.125, 0.265] | $< 0.001$ |
| Norms | 0.548 | 0.548 | [0.480, 0.617] | $< 0.001$ | 0.303 | 0.303 | [0.230, 0.377] | $< 0.001$ | 0.448 | 0.448 | [0.377, 0.519] | $< 0.001$ |
| Perceived behavioural control | 0.160 | 0.160 | [0.093, 0.227] | $< 0.001$ | 0.257 | 0.257 | [0.182, 0.332] | $< 0.001$ | 0.077 | 0.077 | [0.007, 0.148] | 0.031 |
| Intention | -0.092 | -0.092 | [-0.149, -0.036] | 0.001 | -0.099 | -0.099 | [-0.159, -0.038] | 0.001 | -0.099 | -0.099 | [-0.163, -0.034] | 0.003 |
| SDR_PQ | 0.031 | 0.031 | [-0.027, 0.089] | 0.294 | 0.014 | 0.014 | [-0.043, 0.071] | 0.628 | 0.003 | 0.003 | [-0.055, 0.060] | 0.925 |
| SDR_NQ | 0.111 | 0.111 | [0.052, 0.171] | $< 0.001$ | 0.008 | 0.008 | [-0.049, 0.066] | 0.775 | 0.133 | 0.133 | [0.075, 0.191] | $< 0.001$ |
| Model $R^2$ | 0.535 | | | | 0.561 | | | | 0.557 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.16:** Linear regression parameter estimates: Denmark.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.069 | [-0.106, 0.244] | 0.438 | | -0.236 | [-0.433, -0.039] | 0.019 | | -0.165 | [-0.362, 0.032] | 0.100 |
| Male | -0.042 | -0.085 | [-0.175, 0.005] | 0.065 | -0.019 | -0.038 | [-0.138, 0.062] | 0.453 | -0.026 | -0.053 | [-0.154, 0.049] | 0.306 |
| Age 18–34 years | -0.035 | -0.077 | [-0.192, 0.039] | 0.194 | 0.060 | 0.130 | [-0.002, 0.261] | 0.053 | -0.022 | -0.047 | [-0.177, 0.082] | 0.473 |
| Age 35–54 years | -0.057 | -0.119 | [-0.227, -0.012] | 0.030 | 0.037 | 0.078 | [-0.044, 0.200] | 0.208 | -0.010 | -0.020 | [-0.141, 0.101] | 0.742 |
| Secondary education or lower | -0.069 | -0.140 | [-0.230, -0.049] | 0.003 | 0.001 | 0.001 | [-0.100, 0.102] | 0.982 | 0.058 | 0.118 | [0.015, 0.220] | 0.024 |
| Rural residence | -0.036 | -0.087 | [-0.196, 0.022] | 0.116 | -0.025 | -0.060 | [-0.182, 0.062] | 0.332 | -0.054 | -0.131 | [-0.253, -0.009] | 0.035 |
| Drives 1–3 days per week | 0.065 | 0.146 | [-0.017, 0.308] | 0.079 | 0.068 | 0.152 | [-0.030, 0.334] | 0.101 | 0.051 | 0.113 | [-0.069, 0.296] | 0.224 |
| Drives at least 4 days per week | 0.078 | 0.161 | [0.008, 0.314] | 0.039 | 0.125 | 0.257 | [0.087, 0.428] | 0.003 | 0.114 | 0.235 | [0.064, 0.406] | 0.007 |
| Attitudes | 0.096 | 0.096 | [0.024, 0.169] | 0.009 | 0.287 | 0.287 | [0.212, 0.363] | $< 0.001$ | 0.269 | 0.269 | [0.197, 0.342] | $< 0.001$ |
| Norms | 0.535 | 0.535 | [0.466, 0.605] | $< 0.001$ | 0.278 | 0.278 | [0.205, 0.351] | $< 0.001$ | 0.440 | 0.440 | [0.366, 0.515] | $< 0.001$ |
| Perceived behavioural control | 0.215 | 0.215 | [0.139, 0.292] | $< 0.001$ | 0.260 | 0.260 | [0.186, 0.334] | $< 0.001$ | 0.113 | 0.113 | [0.044, 0.183] | 0.001 |
| Intention | -0.047 | -0.047 | [-0.092, -0.001] | 0.045 | -0.038 | -0.038 | [-0.089, 0.013] | 0.145 | -0.045 | -0.044 | [-0.099, 0.010] | 0.109 |
| SDR_PQ | 0.042 | 0.042 | [-0.003, 0.088] | 0.066 | 0.055 | 0.055 | [0.004, 0.106] | 0.035 | -0.003 | -0.003 | [-0.055, 0.050] | 0.924 |
| SDR_NQ | 0.101 | 0.101 | [0.051, 0.150] | $< 0.001$ | 0.057 | 0.057 | [0.001, 0.112] | 0.045 | 0.074 | 0.074 | [0.019, 0.129] | 0.009 |
| Model $R^2$ | 0.686 | | | | 0.608 | | | | 0.605 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.17:** Linear regression parameter estimates: Finland.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.113 | [-0.316, 0.090] | 0.274 | | -0.209 | [-0.402, -0.015] | 0.035 | | -0.212 | [-0.392, -0.031] | 0.022 |
| Male | 0.003 | 0.007 | [-0.113, 0.126] | 0.911 | -0.034 | -0.068 | [-0.180, 0.044] | 0.232 | -0.013 | -0.026 | [-0.133, 0.081] | 0.636 |
| Age 18–34 years | 0.015 | 0.032 | [-0.118, 0.182] | 0.676 | -0.077 | -0.170 | [-0.315, -0.024] | 0.022 | -0.069 | -0.152 | [-0.289, -0.016] | 0.029 |
| Age 35–54 years | -0.069 | -0.142 | [-0.282, -0.002] | 0.046 | -0.042 | -0.088 | [-0.221, 0.046] | 0.197 | -0.063 | -0.131 | [-0.257, -0.005] | 0.041 |
| Secondary education or lower | 0.052 | 0.105 | [-0.012, 0.222] | 0.079 | 0.006 | 0.012 | [-0.098, 0.122] | 0.830 | 0.036 | 0.072 | [-0.032, 0.176] | 0.173 |
| Rural residence | -0.007 | -0.019 | [-0.179, 0.141] | 0.816 | 0.049 | 0.136 | [-0.015, 0.287] | 0.078 | -0.011 | -0.031 | [-0.173, 0.111] | 0.671 |
| Drives 1–3 days per week | 0.045 | 0.098 | [-0.088, 0.284] | 0.302 | 0.137 | 0.298 | [0.123, 0.472] | 0.001 | 0.095 | 0.206 | [0.041, 0.371] | 0.015 |
| Drives at least 4 days per week | 0.060 | 0.121 | [-0.053, 0.295] | 0.173 | 0.190 | 0.382 | [0.218, 0.545] | $< 0.001$ | 0.200 | 0.401 | [0.248, 0.555] | $< 0.001$ |
| Attitudes | 0.163 | 0.163 | [0.096, 0.231] | $< 0.001$ | 0.239 | 0.239 | [0.170, 0.309] | $< 0.001$ | 0.150 | 0.150 | [0.082, 0.217] | $< 0.001$ |
| Norms | 0.467 | 0.467 | [0.400, 0.534] | $< 0.001$ | 0.238 | 0.238 | [0.167, 0.309] | $< 0.001$ | 0.461 | 0.461 | [0.394, 0.529] | $< 0.001$ |
| Perceived behavioural control | 0.168 | 0.168 | [0.098, 0.238] | $< 0.001$ | 0.318 | 0.318 | [0.241, 0.395] | $< 0.001$ | 0.154 | 0.154 | [0.087, 0.221] | $< 0.001$ |
| Intention | -0.063 | -0.063 | [-0.121, -0.005] | 0.033 | -0.042 | -0.042 | [-0.100, 0.015] | 0.149 | -0.097 | -0.097 | [-0.156, -0.038] | 0.001 |
| SDR_PQ | 0.072 | 0.072 | [0.013, 0.130] | 0.016 | 0.058 | 0.058 | [0.003, 0.113] | 0.040 | 0.022 | 0.022 | [-0.032, 0.076] | 0.419 |
| SDR_NQ | 0.006 | 0.006 | [-0.056, 0.068] | 0.855 | 0.045 | 0.045 | [-0.012, 0.102] | 0.121 | 0.095 | 0.095 | [0.040, 0.150] | 0.001 |
| Model $R^2$ | 0.450 | | | | 0.513 | | | | 0.567 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.18:** Linear regression parameter estimates: France.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.031 | [-0.154, 0.217] | 0.740 | | -0.155 | [-0.338, 0.029] | 0.098 | | -0.147 | [-0.313, 0.019] | 0.083 |
| Male | -0.002 | -0.005 | [-0.106, 0.097] | 0.928 | -0.004 | -0.008 | [-0.106, 0.091] | 0.877 | 0.008 | 0.017 | [-0.074, 0.107] | 0.714 |
| Age 18–34 years | -0.001 | -0.001 | [-0.139, 0.136] | 0.986 | 0.040 | 0.090 | [-0.048, 0.229] | 0.200 | 0.005 | 0.011 | [-0.111, 0.134] | 0.856 |
| Age 35–54 years | -0.033 | -0.069 | [-0.189, 0.052] | 0.262 | 0.013 | 0.026 | [-0.094, 0.146] | 0.670 | 0.016 | 0.033 | [-0.074, 0.141] | 0.545 |
| Secondary education or lower | 0.037 | 0.075 | [-0.025, 0.174] | 0.141 | 0.047 | 0.094 | [-0.003, 0.192] | 0.058 | 0.019 | 0.038 | [-0.050, 0.127] | 0.397 |
| Rural residence | -0.009 | -0.019 | [-0.134, 0.095] | 0.740 | -0.006 | -0.014 | [-0.126, 0.098] | 0.803 | -0.011 | -0.024 | [-0.127, 0.079] | 0.644 |
| Drives 1–3 days per week | -0.026 | -0.058 | [-0.229, 0.114] | 0.510 | 0.031 | 0.069 | [-0.100, 0.238] | 0.424 | 0.028 | 0.063 | [-0.091, 0.217] | 0.422 |
| Drives at least 4 days per week | -0.017 | -0.034 | [-0.194, 0.125] | 0.671 | 0.047 | 0.097 | [-0.060, 0.254] | 0.227 | 0.074 | 0.152 | [0.009, 0.295] | 0.038 |
| Attitudes | 0.241 | 0.241 | [0.173, 0.308] | $< 0.001$ | 0.215 | 0.215 | [0.143, 0.287] | $< 0.001$ | 0.178 | 0.178 | [0.117, 0.240] | $< 0.001$ |
| Norms | 0.486 | 0.486 | [0.424, 0.549] | $< 0.001$ | 0.392 | 0.392 | [0.329, 0.455] | $< 0.001$ | 0.581 | 0.581 | [0.524, 0.639] | $< 0.001$ |
| Perceived behavioural control | 0.092 | 0.092 | [0.028, 0.157] | 0.005 | 0.233 | 0.233 | [0.161, 0.306] | $< 0.001$ | 0.123 | 0.123 | [0.062, 0.183] | $< 0.001$ |
| Intention | -0.078 | -0.078 | [-0.129, -0.027] | 0.003 | -0.053 | -0.053 | [-0.103, -0.002] | 0.040 | -0.043 | -0.043 | [-0.089, 0.003] | 0.066 |
| SDR_PQ | 0.022 | 0.022 | [-0.030, 0.073] | 0.408 | -0.001 | -0.001 | [-0.052, 0.049] | 0.959 | -0.015 | -0.015 | [-0.061, 0.031] | 0.517 |
| SDR_NQ | 0.036 | 0.036 | [-0.020, 0.092] | 0.202 | -0.012 | -0.012 | [-0.067, 0.043] | 0.674 | -0.052 | -0.052 | [-0.102, -0.003] | 0.038 |
| Model $R^2$ | 0.531 | | | | 0.549 | | | | 0.626 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.19:** Linear regression parameter estimates: Germany.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.061 | [-0.159, 0.281] | 0.584 | | -0.263 | [-0.495, -0.031] | 0.027 | | -0.131 | [-0.348, 0.086] | 0.235 |
| Male | -0.043 | -0.085 | [-0.199, 0.028] | 0.139 | -0.003 | -0.006 | [-0.125, 0.112] | 0.917 | 0.029 | 0.058 | [-0.055, 0.171] | 0.315 |
| Age 18–34 years | 0.013 | 0.029 | [-0.126, 0.184] | 0.712 | 0.077 | 0.171 | [0.007, 0.334] | 0.041 | -0.045 | -0.099 | [-0.256, 0.058] | 0.215 |
| Age 35–54 years | -0.021 | -0.043 | [-0.180, 0.094] | 0.539 | 0.042 | 0.087 | [-0.056, 0.230] | 0.235 | -0.059 | -0.121 | [-0.256, 0.015] | 0.082 |
| Secondary education or lower | -0.055 | -0.112 | [-0.232, 0.008] | 0.066 | -0.003 | -0.005 | [-0.132, 0.121] | 0.936 | 0.053 | 0.107 | [-0.011, 0.226] | 0.076 |
| Rural residence | -0.028 | -0.067 | [-0.203, 0.070] | 0.337 | 0.006 | 0.014 | [-0.129, 0.156] | 0.851 | -0.026 | -0.062 | [-0.196, 0.072] | 0.363 |
| Drives 1–3 days per week | 0.020 | 0.043 | [-0.154, 0.239] | 0.671 | 0.085 | 0.178 | [-0.028, 0.385] | 0.090 | 0.045 | 0.094 | [-0.100, 0.287] | 0.344 |
| Drives at least 4 days per week | 0.051 | 0.103 | [-0.089, 0.295] | 0.293 | 0.108 | 0.217 | [0.016, 0.419] | 0.035 | 0.084 | 0.169 | [-0.020, 0.358] | 0.079 |
| Attitudes | 0.200 | 0.200 | [0.130, 0.271] | $< 0.001$ | 0.268 | 0.268 | [0.190, 0.346] | $< 0.001$ | 0.223 | 0.223 | [0.155, 0.292] | $< 0.001$ |
| Norms | 0.566 | 0.566 | [0.500, 0.631] | $< 0.001$ | 0.307 | 0.307 | [0.232, 0.382] | $< 0.001$ | 0.404 | 0.404 | [0.331, 0.477] | $< 0.001$ |
| Perceived behavioural control | 0.010 | 0.010 | [-0.059, 0.079] | 0.783 | 0.174 | 0.174 | [0.094, 0.254] | $< 0.001$ | 0.146 | 0.146 | [0.074, 0.217] | $< 0.001$ |
| Intention | -0.104 | -0.103 | [-0.159, -0.047] | $< 0.001$ | -0.088 | -0.087 | [-0.147, -0.026] | 0.005 | -0.118 | -0.116 | [-0.173, -0.059] | $< 0.001$ |
| SDR_PQ | -0.090 | -0.090 | [-0.150, -0.030] | 0.003 | -0.058 | -0.058 | [-0.121, 0.005] | 0.070 | -0.073 | -0.073 | [-0.132, -0.013] | 0.017 |
| SDR_NQ | -0.033 | -0.033 | [-0.096, 0.029] | 0.298 | -0.033 | -0.033 | [-0.099, 0.032] | 0.315 | 0.028 | 0.028 | [-0.034, 0.090] | 0.370 |
| Model $R^2$ | 0.524 | | | | 0.479 | | | | 0.540 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.20:** Linear regression parameter estimates: Greece.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.082 | [-0.301, 0.136] | 0.460 | | -0.297 | [-0.499, -0.094] | 0.004 | | -0.274 | [-0.457, -0.091] | 0.003 |
| Male | 0.021 | 0.042 | [-0.087, 0.172] | 0.519 | -0.017 | -0.034 | [-0.153, 0.085] | 0.571 | 0.059 | 0.119 | [0.010, 0.228] | 0.032 |
| Age 18–34 years | 0.018 | 0.041 | [-0.129, 0.212] | 0.634 | 0.096 | 0.224 | [0.064, 0.384] | 0.006 | 0.027 | 0.063 | [-0.080, 0.206] | 0.390 |
| Age 35–54 years | 0.033 | 0.068 | [-0.076, 0.212] | 0.358 | 0.108 | 0.218 | [0.084, 0.352] | 0.001 | 0.048 | 0.098 | [-0.022, 0.218] | 0.109 |
| Secondary education or lower | 0.049 | 0.105 | [-0.030, 0.241] | 0.128 | 0.032 | 0.069 | [-0.057, 0.195] | 0.284 | -0.025 | -0.053 | [-0.167, 0.061] | 0.362 |
| Rural residence | -0.019 | -0.071 | [-0.306, 0.164] | 0.555 | 0.012 | 0.044 | [-0.177, 0.264] | 0.697 | -0.014 | -0.053 | [-0.247, 0.142] | 0.597 |
| Drives 1–3 days per week | -0.019 | -0.052 | [-0.297, 0.192] | 0.675 | -0.025 | -0.071 | [-0.297, 0.156] | 0.541 | 0.002 | 0.005 | [-0.199, 0.209] | 0.960 |
| Drives at least 4 days per week | 0.000 | 0.001 | [-0.202, 0.203] | 0.995 | 0.095 | 0.215 | [0.027, 0.402] | 0.025 | 0.105 | 0.237 | [0.068, 0.407] | 0.006 |
| Attitudes | 0.081 | 0.081 | [0.004, 0.158] | 0.039 | 0.251 | 0.251 | [0.177, 0.325] | $< 0.001$ | 0.155 | 0.155 | [0.090, 0.219] | $< 0.001$ |
| Norms | 0.292 | 0.292 | [0.226, 0.358] | $< 0.001$ | 0.144 | 0.144 | [0.081, 0.207] | $< 0.001$ | 0.300 | 0.300 | [0.240, 0.360] | $< 0.001$ |
| Perceived behavioural control | 0.239 | 0.239 | [0.164, 0.313] | $< 0.001$ | 0.256 | 0.256 | [0.182, 0.330] | $< 0.001$ | 0.198 | 0.198 | [0.134, 0.263] | $< 0.001$ |
| Intention | -0.059 | -0.059 | [-0.122, 0.004] | 0.066 | -0.120 | -0.120 | [-0.180, -0.061] | $< 0.001$ | -0.195 | -0.194 | [-0.248, -0.139] | $< 0.001$ |
| SDR_PQ | -0.034 | -0.034 | [-0.099, 0.031] | 0.301 | -0.030 | -0.030 | [-0.090, 0.031] | 0.336 | -0.051 | -0.051 | [-0.106, 0.004] | 0.067 |
| SDR_NQ | 0.079 | 0.079 | [0.011, 0.148] | 0.024 | 0.011 | 0.011 | [-0.053, 0.075] | 0.733 | 0.107 | 0.107 | [0.050, 0.164] | $< 0.001$ |
| Model $R^2$ | 0.264 | | | | 0.369 | | | | 0.488 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.21:** Linear regression parameter estimates: Ireland.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.286 | [0.083, 0.488] | 0.006 | | -0.103 | [-0.302, 0.095] | 0.307 | | -0.255 | [-0.447, -0.063] | 0.009 |
| Male | -0.027 | -0.053 | [-0.151, 0.044] | 0.284 | -0.014 | -0.028 | [-0.122, 0.066] | 0.560 | -0.029 | -0.057 | [-0.149, 0.035] | 0.225 |
| Age 18–34 years | -0.079 | -0.177 | [-0.309, -0.046] | 0.008 | 0.005 | 0.012 | [-0.119, 0.143] | 0.858 | 0.028 | 0.064 | [-0.061, 0.188] | 0.318 |
| Age 35–54 years | -0.027 | -0.055 | [-0.170, 0.060] | 0.348 | -0.003 | -0.005 | [-0.118, 0.107] | 0.926 | -0.008 | -0.016 | [-0.125, 0.092] | 0.767 |
| Secondary education or lower | -0.026 | -0.054 | [-0.154, 0.046] | 0.289 | -0.029 | -0.060 | [-0.158, 0.038] | 0.230 | 0.020 | 0.041 | [-0.054, 0.135] | 0.396 |
| Rural residence | -0.013 | -0.026 | [-0.129, 0.076] | 0.616 | 0.039 | 0.081 | [-0.020, 0.181] | 0.114 | 0.013 | 0.028 | [-0.069, 0.125] | 0.570 |
| Drives 1–3 days per week | -0.058 | -0.138 | [-0.334, 0.058] | 0.167 | 0.024 | 0.058 | [-0.133, 0.249] | 0.549 | 0.077 | 0.183 | [-0.002, 0.368] | 0.052 |
| Drives at least 4 days per week | -0.085 | -0.184 | [-0.364, -0.005] | 0.044 | 0.064 | 0.139 | [-0.037, 0.315] | 0.122 | 0.137 | 0.298 | [0.127, 0.468] | 0.001 |
| Attitudes | 0.212 | 0.212 | [0.145, 0.278] | $< 0.001$ | 0.256 | 0.256 | [0.188, 0.323] | $< 0.001$ | 0.264 | 0.264 | [0.199, 0.330] | $< 0.001$ |
| Norms | 0.403 | 0.403 | [0.340, 0.466] | $< 0.001$ | 0.285 | 0.285 | [0.222, 0.348] | $< 0.001$ | 0.350 | 0.350 | [0.290, 0.411] | $< 0.001$ |
| Perceived behavioural control | 0.214 | 0.214 | [0.147, 0.281] | $< 0.001$ | 0.318 | 0.318 | [0.251, 0.386] | $< 0.001$ | 0.255 | 0.255 | [0.192, 0.317] | $< 0.001$ |
| Intention | -0.052 | -0.052 | [-0.101, -0.003] | 0.037 | -0.086 | -0.086 | [-0.134, -0.038] | $< 0.001$ | -0.032 | -0.032 | [-0.082, 0.019] | 0.216 |
| SDR_PQ | 0.065 | 0.065 | [0.017, 0.114] | 0.009 | 0.026 | 0.026 | [-0.021, 0.074] | 0.277 | -0.005 | -0.005 | [-0.052, 0.042] | 0.833 |
| SDR_NQ | 0.126 | 0.126 | [0.070, 0.181] | $< 0.001$ | 0.043 | 0.043 | [-0.011, 0.097] | 0.119 | 0.080 | 0.080 | [0.028, 0.132] | 0.002 |
| Model $R^2$ | 0.598 | | | | 0.614 | | | | 0.641 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.22:** Linear regression parameter estimates: Italy.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.032 | [-0.158, 0.221] | 0.744 | | -0.178 | [-0.365, 0.009] | 0.061 | | -0.174 | [-0.347, -0.002] | 0.048 |
| Male | -0.024 | -0.049 | [-0.140, 0.042] | 0.296 | 0.052 | 0.104 | [0.015, 0.193] | 0.023 | 0.024 | 0.048 | [-0.034, 0.131] | 0.250 |
| Age 18–34 years | 0.031 | 0.073 | [-0.052, 0.198] | 0.252 | 0.002 | 0.005 | [-0.118, 0.129] | 0.932 | 0.013 | 0.031 | [-0.085, 0.146] | 0.604 |
| Age 35–54 years | 0.022 | 0.045 | [-0.059, 0.149] | 0.395 | 0.068 | 0.138 | [0.034, 0.241] | 0.009 | 0.055 | 0.112 | [0.018, 0.207] | 0.020 |
| Secondary education or lower | 0.025 | 0.052 | [-0.041, 0.144] | 0.272 | 0.004 | 0.008 | [-0.083, 0.099] | 0.860 | 0.019 | 0.040 | [-0.044, 0.124] | 0.354 |
| Rural residence | 0.000 | 0.000 | [-0.125, 0.125] | 0.997 | 0.016 | 0.045 | [-0.078, 0.168] | 0.475 | 0.000 | 0.000 | [-0.114, 0.114] | 1.000 |
| Drives 1–3 days per week | -0.023 | -0.057 | [-0.243, 0.129] | 0.547 | 0.006 | 0.015 | [-0.168, 0.198] | 0.872 | 0.017 | 0.041 | [-0.128, 0.210] | 0.634 |
| Drives at least 4 days per week | -0.040 | -0.088 | [-0.257, 0.081] | 0.306 | 0.034 | 0.074 | [-0.092, 0.240] | 0.383 | 0.040 | 0.089 | [-0.064, 0.242] | 0.255 |
| Attitudes | 0.174 | 0.174 | [0.114, 0.235] | $< 0.001$ | 0.197 | 0.197 | [0.132, 0.261] | $< 0.001$ | 0.193 | 0.193 | [0.138, 0.247] | $< 0.001$ |
| Norms | 0.488 | 0.488 | [0.435, 0.541] | $< 0.001$ | 0.356 | 0.356 | [0.302, 0.411] | $< 0.001$ | 0.521 | 0.521 | [0.467, 0.574] | $< 0.001$ |
| Perceived behavioural control | 0.157 | 0.157 | [0.100, 0.214] | $< 0.001$ | 0.295 | 0.295 | [0.231, 0.359] | $< 0.001$ | 0.117 | 0.117 | [0.067, 0.168] | $< 0.001$ |
| Intention | -0.051 | -0.051 | [-0.097, -0.004] | 0.032 | -0.006 | -0.006 | [-0.052, 0.040] | 0.794 | -0.082 | -0.082 | [-0.125, -0.039] | $< 0.001$ |
| SDR_PQ | 0.008 | 0.008 | [-0.038, 0.055] | 0.725 | -0.013 | -0.013 | [-0.059, 0.033] | 0.575 | 0.021 | 0.021 | [-0.022, 0.063] | 0.344 |
| SDR_NQ | 0.094 | 0.094 | [0.043, 0.146] | $< 0.001$ | 0.032 | 0.032 | [-0.018, 0.083] | 0.209 | 0.085 | 0.085 | [0.039, 0.131] | $< 0.001$ |
| Model $R^2$ | 0.556 | | | | 0.571 | | | | 0.635 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.23:** Linear regression parameter estimates: Latvia.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.056 | [-0.311, 0.200] | 0.668 | | -0.437 | [-0.641, -0.232] | < 0.001 | | -0.456 | [-0.655, -0.258] | < 0.001 |
| Male | 0.021 | 0.041 | [-0.098, 0.181] | 0.559 | -0.024 | -0.048 | [-0.157, 0.061] | 0.386 | 0.008 | 0.016 | [-0.092, 0.124] | 0.772 |
| Age 18–34 years | 0.014 | 0.030 | [-0.142, 0.202] | 0.732 | 0.049 | 0.107 | [-0.036, 0.251] | 0.142 | 0.096 | 0.209 | [0.074, 0.344] | 0.003 |
| Age 35–54 years | -0.026 | -0.052 | [-0.213, 0.108] | 0.522 | 0.087 | 0.177 | [0.047, 0.306] | 0.007 | 0.033 | 0.067 | [-0.057, 0.192] | 0.288 |
| Secondary education or lower | -0.017 | -0.035 | [-0.170, 0.101] | 0.616 | -0.006 | -0.013 | [-0.120, 0.093] | 0.806 | -0.001 | -0.001 | [-0.106, 0.104] | 0.982 |
| Rural residence | -0.005 | -0.012 | [-0.163, 0.140] | 0.880 | 0.009 | 0.020 | [-0.099, 0.140] | 0.738 | -0.045 | -0.104 | [-0.222, 0.014] | 0.085 |
| Drives 1–3 days per week | 0.019 | 0.052 | [-0.210, 0.313] | 0.699 | 0.088 | 0.234 | [0.028, 0.440] | 0.026 | 0.127 | 0.338 | [0.136, 0.540] | 0.001 |
| Drives at least 4 days per week | 0.031 | 0.071 | [-0.155, 0.297] | 0.538 | 0.194 | 0.438 | [0.261, 0.615] | < 0.001 | 0.198 | 0.446 | [0.273, 0.620] | < 0.001 |
| Attitudes | 0.094 | 0.094 | [0.018, 0.170] | 0.015 | 0.260 | 0.260 | [0.191, 0.329] | < 0.001 | 0.133 | 0.133 | [0.065, 0.201] | < 0.001 |
| Norms | 0.425 | 0.425 | [0.355, 0.496] | < 0.001 | 0.296 | 0.296 | [0.231, 0.362] | < 0.001 | 0.437 | 0.437 | [0.373, 0.501] | < 0.001 |
| Perceived behavioural control | 0.185 | 0.185 | [0.112, 0.258] | < 0.001 | 0.296 | 0.296 | [0.226, 0.365] | < 0.001 | 0.201 | 0.201 | [0.134, 0.267] | < 0.001 |
| Intention | -0.130 | -0.130 | [-0.195, -0.065] | < 0.001 | -0.057 | -0.057 | [-0.112, -0.001] | 0.044 | -0.142 | -0.142 | [-0.196, -0.087] | < 0.001 |
| SDR_PQ | -0.024 | -0.024 | [-0.089, 0.042] | 0.476 | 0.010 | 0.010 | [-0.042, 0.062] | 0.693 | -0.018 | -0.018 | [-0.070, 0.033] | 0.491 |
| SDR_NQ | 0.069 | 0.069 | [-0.002, 0.139] | 0.058 | 0.012 | 0.012 | [-0.043, 0.067] | 0.668 | 0.046 | 0.046 | [-0.009, 0.100] | 0.102 |
| Model $R^2$ | 0.355 | | | | 0.599 | | | | 0.612 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.24:** Linear regression parameter estimates: Netherlands.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.075 | [-0.102, 0.252] | 0.404 | | -0.190 | [-0.371, -0.010] | 0.039 | | -0.088 | [-0.259, 0.083] | 0.312 |
| Male | 0.015 | 0.031 | [-0.070, 0.131] | 0.549 | 0.001 | 0.002 | [-0.099, 0.103] | 0.970 | -0.031 | -0.063 | [-0.160, 0.034] | 0.204 |
| Age 18–34 years | -0.096 | -0.207 | [-0.336, -0.079] | 0.002 | 0.049 | 0.105 | [-0.029, 0.239] | 0.124 | -0.059 | -0.127 | [-0.252, -0.002] | 0.046 |
| Age 35–54 years | 0.047 | 0.098 | [-0.024, 0.220] | 0.115 | 0.093 | 0.194 | [0.069, 0.319] | 0.002 | 0.003 | 0.005 | [-0.111, 0.122] | 0.929 |
| Secondary education or lower | 0.005 | 0.009 | [-0.091, 0.109] | 0.857 | 0.025 | 0.051 | [-0.051, 0.152] | 0.327 | 0.043 | 0.087 | [-0.009, 0.183] | 0.077 |
| Rural residence | 0.014 | 0.029 | [-0.070, 0.128] | 0.563 | 0.026 | 0.054 | [-0.045, 0.154] | 0.285 | 0.021 | 0.042 | [-0.052, 0.136] | 0.377 |
| Drives 1–3 days per week | -0.041 | -0.085 | [-0.235, 0.066] | 0.269 | 0.016 | 0.033 | [-0.119, 0.185] | 0.671 | 0.054 | 0.112 | [-0.031, 0.256] | 0.125 |
| Drives at least 4 days per week | -0.048 | -0.096 | [-0.243, 0.051] | 0.200 | 0.030 | 0.061 | [-0.089, 0.211] | 0.425 | 0.056 | 0.112 | [-0.029, 0.254] | 0.120 |
| Attitudes | 0.206 | 0.206 | [0.138, 0.274] | $< 0.001$ | 0.309 | 0.309 | [0.237, 0.382] | $< 0.001$ | 0.142 | 0.142 | [0.085, 0.199] | $< 0.001$ |
| Norms | 0.449 | 0.449 | [0.382, 0.516] | $< 0.001$ | 0.294 | 0.294 | [0.225, 0.363] | $< 0.001$ | 0.472 | 0.472 | [0.413, 0.532] | $< 0.001$ |
| Perceived behavioural control | 0.213 | 0.213 | [0.154, 0.271] | $< 0.001$ | 0.228 | 0.228 | [0.157, 0.299] | $< 0.001$ | 0.250 | 0.250 | [0.193, 0.306] | $< 0.001$ |
| Intention | -0.042 | -0.041 | [-0.091, 0.009] | 0.108 | 0.000 | 0.000 | [-0.051, 0.052] | 0.991 | -0.133 | -0.132 | [-0.184, -0.080] | $< 0.001$ |
| SDR_PQ | 0.029 | 0.029 | [-0.021, 0.079] | 0.252 | 0.030 | 0.030 | [-0.020, 0.080] | 0.241 | 0.007 | 0.007 | [-0.041, 0.054] | 0.789 |
| SDR_NQ | 0.086 | 0.086 | [0.030, 0.143] | 0.003 | 0.057 | 0.057 | [0.000, 0.114] | 0.050 | 0.078 | 0.078 | [0.025, 0.131] | 0.004 |
| Model $R^2$ | 0.605 | | | | 0.597 | | | | 0.642 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.25:** Linear regression parameter estimates: Poland.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.064 | [-0.121, 0.250] | 0.496 | | -0.133 | [-0.314, 0.048] | 0.149 | | -0.176 | [-0.336, -0.016] | 0.032 |
| Male | -0.013 | -0.026 | [-0.142, 0.090] | 0.659 | -0.054 | -0.108 | [-0.219, 0.004] | 0.058 | -0.059 | -0.118 | [-0.218, -0.018] | 0.021 |
| Age 18–34 years | 0.012 | 0.026 | [-0.124, 0.176] | 0.731 | 0.064 | 0.139 | [-0.009, 0.286] | 0.065 | 0.039 | 0.085 | [-0.045, 0.215] | 0.199 |
| Age 35–54 years | -0.015 | -0.031 | [-0.171, 0.109] | 0.664 | 0.073 | 0.149 | [0.013, 0.284] | 0.031 | 0.039 | 0.081 | [-0.038, 0.200] | 0.184 |
| Secondary education or lower | -0.032 | -0.063 | [-0.179, 0.052] | 0.283 | 0.000 | -0.001 | [-0.113, 0.111] | 0.987 | 0.025 | 0.049 | [-0.049, 0.148] | 0.328 |
| Rural residence | 0.007 | 0.018 | [-0.133, 0.168] | 0.820 | -0.054 | -0.140 | [-0.285, 0.005] | 0.059 | -0.029 | -0.076 | [-0.204, 0.051] | 0.241 |
| Drives 1–3 days per week | 0.014 | 0.032 | [-0.155, 0.219] | 0.735 | 0.009 | 0.022 | [-0.158, 0.203] | 0.810 | 0.031 | 0.073 | [-0.085, 0.232] | 0.364 |
| Drives at least 4 days per week | -0.021 | -0.042 | [-0.207, 0.122] | 0.612 | 0.088 | 0.181 | [0.021, 0.340] | 0.026 | 0.122 | 0.250 | [0.109, 0.390] | 0.001 |
| Attitudes | 0.097 | 0.097 | [0.026, 0.168] | 0.008 | 0.181 | 0.181 | [0.105, 0.257] | $< 0.001$ | 0.128 | 0.128 | [0.067, 0.189] | $< 0.001$ |
| Norms | 0.289 | 0.289 | [0.220, 0.358] | $< 0.001$ | 0.152 | 0.152 | [0.087, 0.216] | $< 0.001$ | 0.375 | 0.375 | [0.314, 0.436] | $< 0.001$ |
| Perceived behavioural control | 0.317 | 0.317 | [0.243, 0.391] | $< 0.001$ | 0.387 | 0.387 | [0.312, 0.462] | $< 0.001$ | 0.314 | 0.314 | [0.252, 0.375] | $< 0.001$ |
| Intention | -0.030 | -0.030 | [-0.088, 0.027] | 0.302 | -0.061 | -0.061 | [-0.118, -0.004] | 0.036 | -0.117 | -0.117 | [-0.169, -0.064] | $< 0.001$ |
| SDR_PQ | 0.018 | 0.018 | [-0.042, 0.077] | 0.557 | -0.022 | -0.022 | [-0.080, 0.036] | 0.451 | -0.031 | -0.031 | [-0.082, 0.021] | 0.241 |
| SDR_NQ | 0.103 | 0.103 | [0.037, 0.168] | 0.002 | 0.020 | 0.020 | [-0.041, 0.081] | 0.522 | 0.012 | 0.012 | [-0.042, 0.066] | 0.655 |
| Model $R^2$ | 0.415 | | | | 0.453 | | | | 0.578 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.26:** Linear regression parameter estimates: Portugal.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.008 | [-0.221, 0.205] | 0.941 | | -0.269 | [-0.456, -0.082] | 0.005 | | -0.214 | [-0.397, -0.032] | 0.021 |
| Male | 0.039 | 0.078 | [-0.035, 0.192] | 0.176 | -0.052 | -0.104 | [-0.202, -0.007] | 0.036 | 0.028 | 0.056 | [-0.042, 0.155] | 0.263 |
| Age 18–34 years | -0.042 | -0.097 | [-0.246, 0.051] | 0.197 | 0.100 | 0.232 | [0.098, 0.366] | 0.001 | 0.018 | 0.042 | [-0.089, 0.172] | 0.529 |
| Age 35–54 years | -0.073 | -0.149 | [-0.277, -0.021] | 0.022 | 0.065 | 0.131 | [0.020, 0.243] | 0.021 | 0.021 | 0.042 | [-0.067, 0.151] | 0.453 |
| Secondary education or lower | 0.042 | 0.084 | [-0.029, 0.197] | 0.145 | -0.021 | -0.043 | [-0.141, 0.056] | 0.394 | -0.019 | -0.038 | [-0.135, 0.059] | 0.446 |
| Rural residence | -0.020 | -0.061 | [-0.228, 0.107] | 0.478 | -0.002 | -0.006 | [-0.152, 0.141] | 0.941 | 0.031 | 0.094 | [-0.049, 0.238] | 0.197 |
| Drives 1–3 days per week | 0.023 | 0.058 | [-0.164, 0.281] | 0.607 | 0.028 | 0.071 | [-0.124, 0.265] | 0.475 | 0.026 | 0.065 | [-0.125, 0.255] | 0.505 |
| Drives at least 4 days per week | 0.009 | 0.019 | [-0.180, 0.219] | 0.848 | 0.137 | 0.302 | [0.128, 0.476] | 0.001 | 0.095 | 0.211 | [0.041, 0.381] | 0.015 |
| Attitudes | 0.162 | 0.162 | [0.097, 0.227] | $< 0.001$ | 0.204 | 0.204 | [0.142, 0.265] | $< 0.001$ | 0.161 | 0.161 | [0.102, 0.219] | $< 0.001$ |
| Norms | 0.285 | 0.285 | [0.224, 0.347] | $< 0.001$ | 0.198 | 0.198 | [0.142, 0.254] | $< 0.001$ | 0.388 | 0.388 | [0.326, 0.450] | $< 0.001$ |
| Perceived behavioural control | 0.238 | 0.238 | [0.172, 0.304] | $< 0.001$ | 0.368 | 0.368 | [0.305, 0.432] | $< 0.001$ | 0.167 | 0.167 | [0.106, 0.228] | $< 0.001$ |
| Intention | -0.116 | -0.116 | [-0.171, -0.060] | $< 0.001$ | -0.087 | -0.087 | [-0.137, -0.037] | 0.001 | -0.165 | -0.165 | [-0.217, -0.112] | $< 0.001$ |
| SDR_PQ | 0.030 | 0.030 | [-0.026, 0.086] | 0.291 | 0.005 | 0.005 | [-0.044, 0.054] | 0.830 | -0.036 | -0.036 | [-0.084, 0.013] | 0.148 |
| SDR_NQ | 0.099 | 0.099 | [0.039, 0.159] | 0.001 | 0.021 | 0.021 | [-0.032, 0.073] | 0.441 | 0.051 | 0.051 | [0.000, 0.102] | 0.051 |
| Model $R^2$ | 0.369 | | | | 0.518 | | | | 0.539 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.27:** Linear regression parameter estimates: Serbia.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.024 | [-0.237, 0.190] | 0.829 | | -0.131 | [-0.315, 0.054] | 0.165 | | -0.214 | [-0.393, -0.035] | 0.019 |
| Male | 0.051 | 0.104 | [-0.023, 0.231] | 0.108 | 0.002 | 0.005 | [-0.103, 0.113] | 0.928 | 0.053 | 0.108 | [0.003, 0.213] | 0.045 |
| Age 18–34 years | -0.042 | -0.092 | [-0.251, 0.066] | 0.254 | 0.009 | 0.020 | [-0.120, 0.161] | 0.776 | -0.004 | -0.009 | [-0.145, 0.127] | 0.896 |
| Age 35–54 years | -0.036 | -0.074 | [-0.218, 0.070] | 0.314 | 0.020 | 0.041 | [-0.083, 0.166] | 0.516 | -0.030 | -0.061 | [-0.182, 0.060] | 0.323 |
| Secondary education or lower | -0.006 | -0.011 | [-0.135, 0.112] | 0.859 | 0.004 | 0.008 | [-0.098, 0.115] | 0.880 | -0.005 | -0.011 | [-0.115, 0.093] | 0.836 |
| Rural residence | -0.017 | -0.053 | [-0.239, 0.132] | 0.573 | 0.004 | 0.014 | [-0.146, 0.174] | 0.867 | 0.019 | 0.059 | [-0.096, 0.215] | 0.455 |
| Drives 1–3 days per week | 0.049 | 0.122 | [-0.098, 0.342] | 0.275 | -0.015 | -0.037 | [-0.227, 0.152] | 0.700 | 0.077 | 0.194 | [0.010, 0.378] | 0.039 |
| Drives at least 4 days per week | 0.004 | 0.008 | [-0.182, 0.198] | 0.934 | 0.074 | 0.158 | [-0.006, 0.322] | 0.060 | 0.094 | 0.201 | [0.043, 0.360] | 0.013 |
| Attitudes | 0.038 | 0.038 | [-0.037, 0.114] | 0.322 | 0.208 | 0.208 | [0.137, 0.278] | $< 0.001$ | 0.174 | 0.174 | [0.105, 0.242] | $< 0.001$ |
| Norms | 0.182 | 0.182 | [0.115, 0.249] | $< 0.001$ | 0.088 | 0.088 | [0.028, 0.147] | 0.004 | 0.369 | 0.369 | [0.305, 0.433] | $< 0.001$ |
| Perceived behavioural control | 0.420 | 0.420 | [0.349, 0.491] | $< 0.001$ | 0.495 | 0.495 | [0.426, 0.565] | $< 0.001$ | 0.209 | 0.209 | [0.144, 0.274] | $< 0.001$ |
| Intention | -0.068 | -0.068 | [-0.128, -0.008] | 0.026 | -0.004 | -0.004 | [-0.057, 0.048] | 0.876 | -0.095 | -0.095 | [-0.152, -0.038] | 0.001 |
| SDR_PQ | -0.054 | -0.054 | [-0.118, 0.011] | 0.103 | 0.030 | 0.030 | [-0.025, 0.086] | 0.286 | -0.065 | -0.065 | [-0.119, -0.010] | 0.020 |
| SDR_NQ | 0.137 | 0.137 | [0.070, 0.205] | $< 0.001$ | 0.111 | 0.111 | [0.053, 0.169] | $< 0.001$ | 0.097 | 0.097 | [0.040, 0.153] | 0.001 |
| Model $R^2$ | 0.396 | | | | 0.549 | | | | 0.575 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.28:** Linear regression parameter estimates: Slovenia.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.138 | [-0.373, 0.097] | 0.248 | | -0.324 | [-0.527, -0.121] | 0.002 | | -0.276 | [-0.479, -0.074] | 0.008 |
| Male | 0.085 | 0.171 | [0.050, 0.292] | 0.006 | 0.047 | 0.094 | [-0.009, 0.197] | 0.073 | 0.000 | 0.000 | [-0.104, 0.104] | 1.000 |
| Age 18–34 years | -0.032 | -0.074 | [-0.233, 0.084] | 0.357 | 0.054 | 0.126 | [-0.016, 0.267] | 0.081 | 0.021 | 0.048 | [-0.093, 0.189] | 0.502 |
| Age 35–54 years | -0.060 | -0.122 | [-0.258, 0.014] | 0.079 | 0.073 | 0.148 | [0.029, 0.267] | 0.015 | 0.027 | 0.055 | [-0.063, 0.173] | 0.359 |
| Secondary education or lower | 0.026 | 0.053 | [-0.066, 0.172] | 0.382 | -0.014 | -0.029 | [-0.131, 0.074] | 0.586 | 0.020 | 0.040 | [-0.062, 0.142] | 0.438 |
| Rural residence | 0.017 | 0.035 | [-0.086, 0.156] | 0.569 | -0.009 | -0.018 | [-0.122, 0.087] | 0.738 | -0.020 | -0.040 | [-0.144, 0.064] | 0.447 |
| Drives 1–3 days per week | 0.025 | 0.065 | [-0.183, 0.312] | 0.607 | 0.003 | 0.007 | [-0.207, 0.221] | 0.947 | 0.065 | 0.167 | [-0.046, 0.380] | 0.124 |
| Drives at least 4 days per week | 0.037 | 0.084 | [-0.139, 0.306] | 0.462 | 0.122 | 0.276 | [0.083, 0.469] | 0.005 | 0.123 | 0.278 | [0.087, 0.470] | 0.004 |
| Attitudes | 0.120 | 0.120 | [0.055, 0.186] | $< 0.001$ | 0.193 | 0.193 | [0.130, 0.255] | $< 0.001$ | 0.109 | 0.109 | [0.048, 0.169] | $< 0.001$ |
| Norms | 0.321 | 0.321 | [0.256, 0.385] | $< 0.001$ | 0.214 | 0.214 | [0.153, 0.274] | $< 0.001$ | 0.466 | 0.466 | [0.402, 0.530] | $< 0.001$ |
| Perceived behavioural control | 0.203 | 0.203 | [0.139, 0.268] | $< 0.001$ | 0.340 | 0.340 | [0.278, 0.402] | $< 0.001$ | 0.183 | 0.183 | [0.121, 0.244] | $< 0.001$ |
| Intention | -0.132 | -0.132 | [-0.191, -0.072] | $< 0.001$ | -0.127 | -0.127 | [-0.181, -0.072] | $< 0.001$ | -0.087 | -0.087 | [-0.142, -0.032] | 0.002 |
| SDR_PQ | 0.000 | 0.000 | [-0.060, 0.060] | 1.000 | 0.023 | 0.023 | [-0.029, 0.075] | 0.393 | 0.004 | 0.004 | [-0.048, 0.057] | 0.869 |
| SDR_NQ | 0.036 | 0.036 | [-0.026, 0.097] | 0.257 | 0.001 | 0.001 | [-0.052, 0.054] | 0.966 | 0.039 | 0.039 | [-0.014, 0.092] | 0.149 |
| Model $R^2$ | 0.309 | | | | 0.483 | | | | 0.490 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.29:** Linear regression parameter estimates: Spain.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.085 | [-0.268, 0.097] | 0.359 | | -0.232 | [-0.433, -0.032] | 0.023 | | -0.251 | [-0.438, -0.063] | 0.009 |
| Male | 0.055 | 0.110 | [0.005, 0.215] | 0.040 | 0.022 | 0.045 | [-0.068, 0.158] | 0.436 | 0.050 | 0.101 | [-0.006, 0.208] | 0.065 |
| Age 18–34 years | -0.003 | -0.006 | [-0.156, 0.144] | 0.937 | 0.096 | 0.229 | [0.065, 0.393] | 0.006 | 0.037 | 0.089 | [-0.065, 0.243] | 0.258 |
| Age 35–54 years | 0.004 | 0.008 | [-0.115, 0.132] | 0.897 | 0.048 | 0.097 | [-0.039, 0.232] | 0.161 | 0.014 | 0.029 | [-0.098, 0.155] | 0.658 |
| Secondary education or lower | -0.039 | -0.079 | [-0.186, 0.028] | 0.150 | 0.008 | 0.017 | [-0.101, 0.135] | 0.776 | 0.002 | 0.004 | [-0.107, 0.114] | 0.949 |
| Rural residence | 0.031 | 0.089 | [-0.059, 0.237] | 0.237 | -0.027 | -0.077 | [-0.239, 0.085] | 0.349 | 0.024 | 0.068 | [-0.084, 0.220] | 0.379 |
| Drives 1–3 days per week | 0.019 | 0.041 | [-0.130, 0.211] | 0.640 | 0.020 | 0.044 | [-0.143, 0.231] | 0.644 | 0.054 | 0.119 | [-0.056, 0.294] | 0.183 |
| Drives at least 4 days per week | 0.026 | 0.053 | [-0.106, 0.213] | 0.512 | 0.088 | 0.178 | [0.005, 0.352] | 0.044 | 0.101 | 0.205 | [0.042, 0.368] | 0.014 |
| Attitudes | 0.134 | 0.134 | [0.056, 0.211] | 0.001 | 0.184 | 0.184 | [0.097, 0.272] | $< 0.001$ | 0.068 | 0.068 | [-0.003, 0.140] | 0.062 |
| Norms | 0.415 | 0.415 | [0.350, 0.480] | $< 0.001$ | 0.260 | 0.260 | [0.194, 0.326] | $< 0.001$ | 0.404 | 0.404 | [0.335, 0.472] | $< 0.001$ |
| Perceived behavioural control | 0.223 | 0.223 | [0.151, 0.295] | $< 0.001$ | 0.260 | 0.260 | [0.175, 0.344] | $< 0.001$ | 0.204 | 0.204 | [0.133, 0.275] | $< 0.001$ |
| Intention | -0.068 | -0.068 | [-0.119, -0.016] | 0.010 | -0.071 | -0.070 | [-0.127, -0.014] | 0.015 | -0.076 | -0.076 | [-0.130, -0.021] | 0.007 |
| SDR_PQ | -0.041 | -0.041 | [-0.095, 0.013] | 0.138 | -0.020 | -0.020 | [-0.079, 0.039] | 0.500 | -0.048 | -0.048 | [-0.104, 0.009] | 0.097 |
| SDR_NQ | 0.093 | 0.093 | [0.036, 0.150] | 0.001 | 0.058 | 0.058 | [-0.005, 0.120] | 0.070 | 0.148 | 0.148 | [0.090, 0.207] | $< 0.001$ |
| Model $R^2$ | 0.539 | | | | 0.446 | | | | 0.513 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.30:** Linear regression parameter estimates: Sweden.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.002 | [-0.155, 0.158] | 0.985 | | -0.191 | [-0.373, -0.010] | 0.039 | | -0.003 | [-0.172, 0.165] | 0.968 |
| Male | -0.004 | -0.009 | [-0.099, 0.082] | 0.853 | -0.026 | -0.051 | [-0.156, 0.053] | 0.334 | -0.046 | -0.092 | [-0.191, 0.006] | 0.067 |
| Age 18–34 years | -0.020 | -0.042 | [-0.157, 0.074] | 0.479 | 0.058 | 0.123 | [-0.015, 0.260] | 0.081 | -0.117 | -0.249 | [-0.373, -0.125] | $< 0.001$ |
| Age 35–54 years | -0.008 | -0.017 | [-0.129, 0.095] | 0.764 | 0.022 | 0.046 | [-0.084, 0.175] | 0.487 | -0.052 | -0.109 | [-0.229, 0.011] | 0.074 |
| Secondary education or lower | -0.016 | -0.033 | [-0.123, 0.057] | 0.472 | -0.006 | -0.013 | [-0.117, 0.091] | 0.806 | 0.009 | 0.019 | [-0.077, 0.115] | 0.699 |
| Rural residence | -0.016 | -0.040 | [-0.154, 0.075] | 0.496 | -0.005 | -0.012 | [-0.144, 0.121] | 0.862 | -0.007 | -0.019 | [-0.142, 0.104] | 0.761 |
| Drives 1–3 days per week | 0.038 | 0.081 | [-0.055, 0.217] | 0.242 | 0.082 | 0.174 | [0.017, 0.331] | 0.030 | 0.072 | 0.151 | [0.006, 0.297] | 0.041 |
| Drives at least 4 days per week | 0.021 | 0.041 | [-0.089, 0.171] | 0.534 | 0.112 | 0.224 | [0.074, 0.373] | 0.003 | 0.114 | 0.229 | [0.090, 0.367] | 0.001 |
| Attitudes | 0.191 | 0.191 | [0.125, 0.257] | $< 0.001$ | 0.291 | 0.291 | [0.217, 0.365] | $< 0.001$ | 0.231 | 0.231 | [0.164, 0.298] | $< 0.001$ |
| Norms | 0.614 | 0.614 | [0.554, 0.675] | $< 0.001$ | 0.303 | 0.303 | [0.234, 0.373] | $< 0.001$ | 0.425 | 0.425 | [0.360, 0.490] | $< 0.001$ |
| Perceived behavioural control | 0.147 | 0.147 | [0.082, 0.212] | $< 0.001$ | 0.227 | 0.227 | [0.149, 0.305] | $< 0.001$ | 0.236 | 0.236 | [0.167, 0.306] | $< 0.001$ |
| Intention | 0.001 | 0.001 | [-0.043, 0.046] | 0.948 | -0.059 | -0.059 | [-0.110, -0.008] | 0.024 | -0.091 | -0.090 | [-0.139, -0.041] | $< 0.001$ |
| SDR_PQ | -0.014 | -0.014 | [-0.059, 0.031] | 0.541 | -0.006 | -0.006 | [-0.059, 0.046] | 0.818 | -0.047 | -0.047 | [-0.096, 0.002] | 0.059 |
| SDR_NQ | -0.037 | -0.037 | [-0.088, 0.014] | 0.158 | 0.054 | 0.054 | [-0.005, 0.114] | 0.073 | 0.019 | 0.019 | [-0.036, 0.074] | 0.506 |
| Model $R^2$ | 0.695 | | | | 0.593 | | | | 0.650 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.31:** Linear regression parameter estimates: Switzerland.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | 0.123 | [-0.040, 0.287] | 0.140 | | -0.183 | [-0.338, -0.027] | 0.022 | | -0.161 | [-0.319, -0.004] | 0.044 |
| Male | -0.015 | -0.030 | [-0.127, 0.066] | 0.539 | -0.013 | -0.026 | [-0.118, 0.065] | 0.572 | -0.016 | -0.033 | [-0.124, 0.059] | 0.482 |
| Age 18–34 years | 0.007 | 0.014 | [-0.105, 0.134] | 0.813 | 0.075 | 0.162 | [0.045, 0.279] | 0.007 | 0.028 | 0.062 | [-0.054, 0.177] | 0.295 |
| Age 35–54 years | -0.034 | -0.070 | [-0.183, 0.043] | 0.227 | 0.042 | 0.086 | [-0.022, 0.194] | 0.118 | -0.007 | -0.014 | [-0.122, 0.093] | 0.792 |
| Secondary education or lower | -0.033 | -0.067 | [-0.166, 0.032] | 0.186 | -0.012 | -0.023 | [-0.117, 0.071] | 0.630 | 0.040 | 0.081 | [-0.013, 0.176] | 0.093 |
| Rural residence | -0.043 | -0.088 | [-0.190, 0.013] | 0.087 | 0.001 | 0.003 | [-0.094, 0.100] | 0.950 | 0.036 | 0.076 | [-0.021, 0.173] | 0.127 |
| Drives 1–3 days per week | 0.014 | 0.030 | [-0.117, 0.177] | 0.692 | 0.067 | 0.141 | [0.001, 0.280] | 0.048 | 0.041 | 0.087 | [-0.053, 0.227] | 0.222 |
| Drives at least 4 days per week | -0.025 | -0.050 | [-0.191, 0.090] | 0.481 | 0.075 | 0.151 | [0.018, 0.284] | 0.026 | 0.063 | 0.126 | [-0.008, 0.260] | 0.065 |
| Attitudes | 0.246 | 0.246 | [0.182, 0.310] | $< 0.001$ | 0.247 | 0.247 | [0.184, 0.311] | $< 0.001$ | 0.291 | 0.291 | [0.230, 0.353] | $< 0.001$ |
| Norms | 0.455 | 0.455 | [0.395, 0.515] | $< 0.001$ | 0.350 | 0.350 | [0.292, 0.409] | $< 0.001$ | 0.457 | 0.457 | [0.396, 0.518] | $< 0.001$ |
| Perceived behavioural control | 0.135 | 0.135 | [0.074, 0.197] | $< 0.001$ | 0.272 | 0.272 | [0.209, 0.335] | $< 0.001$ | 0.101 | 0.101 | [0.041, 0.160] | 0.001 |
| Intention | -0.057 | -0.057 | [-0.104, -0.010] | 0.018 | -0.020 | -0.020 | [-0.067, 0.026] | 0.387 | -0.054 | -0.054 | [-0.102, -0.006] | 0.026 |
| SDR_PQ | 0.038 | 0.038 | [-0.009, 0.086] | 0.110 | 0.036 | 0.036 | [-0.009, 0.082] | 0.117 | -0.046 | -0.046 | [-0.091, 0.000] | 0.048 |
| SDR_NQ | 0.084 | 0.084 | [0.033, 0.136] | 0.001 | 0.050 | 0.050 | [0.001, 0.099] | 0.045 | 0.030 | 0.030 | [-0.019, 0.079] | 0.231 |
| Model $R^2$ | 0.583 | | | | 0.625 | | | | 0.624 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

**Table F.32:** Linear regression parameter estimates: United Kingdom.

| Predictor | DUI | | | | Mobile phone use while driving | | | | Speeding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ | $\widehat{\beta}^*$ | $\widehat{\beta}$ | 95% CI | $p$ |
| Intercept | | -0.001 | [-0.209, 0.206] | 0.989 | | -0.106 | [-0.317, 0.105] | 0.325 | | 0.048 | [-0.163, 0.260] | 0.655 |
| Male | 0.015 | 0.030 | [-0.077, 0.137] | 0.584 | -0.008 | -0.017 | [-0.126, 0.092] | 0.760 | -0.016 | -0.032 | [-0.143, 0.079] | 0.573 |
| Age 18–34 years | 0.051 | 0.107 | [-0.045, 0.260] | 0.166 | 0.134 | 0.285 | [0.130, 0.440] | $< 0.001$ | -0.042 | -0.089 | [-0.244, 0.067] | 0.263 |
| Age 35–54 years | 0.022 | 0.045 | [-0.091, 0.182] | 0.516 | 0.044 | 0.091 | [-0.048, 0.229] | 0.198 | 0.014 | 0.029 | [-0.110, 0.168] | 0.682 |
| Secondary education or lower | -0.006 | -0.012 | [-0.126, 0.103] | 0.842 | 0.060 | 0.122 | [0.004, 0.240] | 0.043 | 0.004 | 0.008 | [-0.108, 0.125] | 0.889 |
| Rural residence | 0.025 | 0.065 | [-0.077, 0.207] | 0.366 | 0.026 | 0.066 | [-0.079, 0.211] | 0.371 | 0.026 | 0.067 | [-0.078, 0.212] | 0.366 |
| Drives 1–3 days per week | 0.001 | 0.002 | [-0.191, 0.195] | 0.983 | -0.062 | -0.131 | [-0.329, 0.066] | 0.191 | -0.066 | -0.140 | [-0.337, 0.058] | 0.166 |
| Drives at least 4 days per week | -0.065 | -0.132 | [-0.318, 0.054] | 0.165 | -0.031 | -0.063 | [-0.252, 0.127] | 0.516 | 0.014 | 0.029 | [-0.163, 0.220] | 0.769 |
| Attitudes | 0.082 | 0.082 | [0.005, 0.160] | 0.038 | 0.226 | 0.226 | [0.140, 0.312] | $< 0.001$ | 0.092 | 0.092 | [0.019, 0.165] | 0.014 |
| Norms | 0.609 | 0.609 | [0.542, 0.675] | $< 0.001$ | 0.479 | 0.479 | [0.411, 0.547] | $< 0.001$ | 0.534 | 0.534 | [0.466, 0.603] | $< 0.001$ |
| Perceived behavioural control | 0.065 | 0.065 | [-0.008, 0.138] | 0.081 | 0.085 | 0.085 | [0.002, 0.168] | 0.044 | 0.184 | 0.184 | [0.112, 0.256] | $< 0.001$ |
| Intention | -0.017 | -0.017 | [-0.075, 0.042] | 0.575 | -0.057 | -0.057 | [-0.115, 0.002] | 0.057 | -0.092 | -0.091 | [-0.151, -0.031] | 0.003 |
| SDR_PQ | 0.036 | 0.036 | [-0.019, 0.090] | 0.200 | -0.018 | -0.018 | [-0.073, 0.038] | 0.533 | -0.029 | -0.029 | [-0.086, 0.028] | 0.312 |
| SDR_NQ | 0.067 | 0.067 | [0.005, 0.129] | 0.035 | 0.021 | 0.021 | [-0.042, 0.084] | 0.515 | -0.006 | -0.006 | [-0.069, 0.057] | 0.847 |
| Model $R^2$ | 0.551 | | | | 0.532 | | | | 0.530 | | | |

*Note.* $\widehat{\beta}$ = estimated unstandardised coefficient; $\widehat{\beta}^*$ = estimated standardised coefficient; CI = confidence interval; DUI = driving under the influence of alcohol, drugs or medication. A standardised coefficient is not reported for the intercept. Values printed as 0.000 in the source output are reported as $p < 0.001$.

# Appendix G

# Comparison of principal-component scores and arithmetic mean item scores

This appendix examines the correspondence between the saved first principal-component scores used in the pooled regression models and arithmetic means of the corresponding questionnaire items. The comparison addresses sensitivity of indicator construction to the weighting of items. It covers all multi-item indicators: self-reported behaviour, norms, perceived behavioural control (PBC), broad attitudes, and the two social-desirability indicators. Intention is excluded because it was measured with one item per behaviour.

## G.1 Coding and calculation

Arithmetic mean scores were calculated from the same items as the corresponding component scores reported in Tables 3.1–3.4. The original response coding was retained. Higher scores therefore indicate more frequent reported behaviour, greater acceptability, stronger endorsement of the capability statements, or stronger agreement with the relevant statements.

For SDR_NQ, the comparison follows the direction of the saved component score used in the regressions: higher values indicate greater admission of negative qualities. The arithmetic mean was therefore calculated from the original responses to the three negative-quality statements, without reversing their direction.

Pearson correlations were calculated between each saved pooled component score and its corresponding arithmetic mean, using the ESRA3 individual country weights. The analytical sample comprised 23,669 respondents from 31 countries. All observations were complete for the items and saved scores used in this comparison.

The broad attitudes and social-desirability indicators were constructed from the same items and respondents in all three behavioural models. Their correlations are consequently identical across topics. The comparison was restricted to pooled scores.

## G.2 Results and interpretation

Table G.1 reports the weighted correlations.

The correlations ranged from 0.9630 to approximately 1.0000. The largest departures from equal weighting occurred for mobile-phone norms and behaviour, followed by

**Table G.1:** Weighted Pearson correlations between saved pooled principal-component scores and arithmetic mean item scores.

| Indicator | Items[a] | Speeding | DUI | Phone use |
|---|---|---|---|---|
| Self-reported behaviour | 4/4/3 | 0.9995 | 0.9996 | 0.9643 |
| Norms | 5/4/5 | 0.9988 | 0.9972 | 0.9630 |
| PBC | 3/3/3 | 0.9999 | 0.9807 | 0.9989 |
| Broad attitudes | 5 | 0.9958 | 0.9958 | 0.9958 |
| SDR_PQ | 3 | 0.9995 | 0.9995 | 0.9995 |
| SDR_NQ | 3 | 1.0000 | 1.0000 | 1.0000 |

*Notes.* $n = 23{,}669$. Correlations use the ESRA3 individual country weights. Values are rounded to four decimal places; 1.0000 does not imply exact identity. PBC = perceived behavioural control. SDR_PQ is oriented towards greater endorsement of positive qualities; SDR_NQ is oriented towards greater admission of negative qualities. Intention is a single-item indicator and is not included.

[a] Where item counts differ, they are presented in the order speeding/DUI/phone use. A single count applies to all three models.

DUI-related PBC. These findings show that the component scores and arithmetic means capture closely related variation in respondents' answers.